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ABSTRACT

The Figure Location Test (FLT) developed by Donlon, Reilly and McKee to provide a machine-scorable test of the cognitive style called field dependence-field independence, was administered as the experimental section of the October 1976, Graduate Record Examination (GRE) Aptitude Test at about one third of the centers in the United States. Initial data analysis showed that the FLT was related to choice of majors: mathematics and chemistry having high mean scores while education, sociology, and nursing had low mean scores. In addition, those who responded that being people-related was an important consideration in choosing their major fields had lower mean scores than those who said it was unimportant. The converse was true for those who said they emphasized intellectuality. Analysis, including analysis of covariance and partial correlation to remove the effects of the GRE-Verbal and Quantitative scores, showed that most of these effects overlapped those of the other variables. That Witkin found some independent relationships between choice of major and a cognitive style test is perhaps due to the fact that he was studying undergraduate rather than graduate students, or to the fact that he was studying students in a single, rather selective, college. (Author/PN)

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GRE

GRADUATE RECORD EXAMINATIONS

# RELATIONSHIP OF THE FIGURE LOCATION TEST TO CHOICE OF GRADUATE MAJOR

Joel T. Campbell
Thomas F. Donlon

GRE Board Professional Report GREB No. 75-7F

November 1980

This report presents the findings of a research project funded by and carried out under the auspices of the Graduate Record Examinations Board.

EDUCATIONAL TESTING SERVICE, PRINCETON, NJ

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# RELATIONSHIP OF THE FIGURE LOCATION TEST TO CHOICE OF GRADUATE MAJOR

Joel T. Campbell
Thomas F. Donlon

GRE Board Professional Report GREB No. 75-7P

November 1980

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## Abstract

The Figure Location Test was developed by Donlon, Reilly and McKee, (1978), to provide a machine-scorable test of the cognitive style called field dependence-field independence. This test was administered as the experimental section of the October, 1976, GRE Aptitude Test at about one third of the centers in the United States. Normative data for the FLT was thus obtained on over 12,000 students, for whom registration questionnaire data as well as the GRE Aptitude Test scores were available. A questionnaire designed primarily to obtain a permanent mailing address was sent to the students in the late fall of 1976. A second questionnaire designed to obtain information on the students' graduate school experience was sent in the late summer of 1978. This questionnaire also asked for self-ratings on personality and attitude factors which might be related to choice of majors.

Initial data analysis showed that the Figure Location Test was related to choice of majors. Those majoring in fields such as mathematics and chemistry had high mean scores, while those majoring in such subjects as education, sociology, and nursing had low mean scores. In addition, those who responded that being people-related was an important consideration in choosing their major fields had lower mean scores than those who said it was unimportant. The converse was true for those who said they emphasized intellectuality.

More complex analysis, including analysis of covariance and partial correlation to remove the effects of the GRE-Verbal and Quantitative scores, showed that most of these effects overlapped those of the other variables. That Witkin and his associates (1977b), found some independent relationships between choice of major and a cognitive style test is perhaps due to the fact that he was studying undergraduate rather than graduate students, or to the fact that he was studying students in a single rather selective college.

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## Background

In recent years an increasing amount of research attention has been given to constructs concerning mental performance which are referred to as cognitive styles. These cognitive styles have been conceptualized as typical modes of perceiving, remembering, thinking, and problem solving (Messick, 1969). They have been referred to as "styles" because they are thought to represent an individual's typical approach to cognitive tasks. Although a fairly diverse range of cognitive styles have been identified (Impulsiveness-restraint, Flexibility-rigidity) the most heavily researched cognitive style by far has been field independence-dependence.

Most of the basic research on the field-independence construct has utilized individually administered and scored tests. The two most commonly used measures are: (a) the Rod and Frame Test (RFT), in which the subject is seated in a totally darkened room and must adjust to the upright a tilted luminous rod centered within a tilted luminous frame, while the frame remains in its initial position; a variation on this task is the Portable Rod and Frame Test (PRFT) which restricts the subjects' perceptual field without a requirement for darkening the room; and (b) the Embedded Figures Test (EFT) which requires the subject to locate a previously seen simple figure within a larger complex figure which has been organized so as to obscure the simple figure. Scores on the EFT are a function of the time taken to find the simple figure. The performance of subjects across two three tasks has been found (Witkin, Oltman, Raskin and Karp, 1971) to be relatively consistent. This finding is the basis for positioning the field independence construct as a perceptual style which reflects the tendency for a subject to be dominated by the overall organization of the surrounding field (field dependence) or to experience parts of the field as discrete from the surrounding context (Witkin, et al, 1971).

Witkin and his colleagues (1977a) have made a case for the relevance of field independence-dependence to educational problems. Up until fairly recently, however, application of cognitive style research was limited because of the individual nature of the measurement procedures. With the development of the Group Embedded Figures Test (GEFT) by Witkin and his colleagues, it became possible to obtain information about an individual's cognitive style in a group setting. The Group Embedded Figures Test consists of a set of complex figures within which a specific simple figure is located. The subject's task is to find and trace the simple figure directly in the test booklet. From the standpoint of a large-scale administration, however, the GEFT has the drawback of requiring trained personnel to score each item. Use of this dimension in a program like the Graduate Record Examinations required an instrument which

could be processed by machine. Accordingly, in 1974 development of a machine-scoreable test of field dependence-independence was begun (Donlon, et al, 1978) with the development of the Figure Location Test.

In their study, a total of 35 items, each consisting of a complex figure with an embedded simple figure, was generated and pretested on an individual basis. The pretest results showed the 35 items to have a good range of item difficulties (as measured by average time to find the simple figure) as well as reasonable item-total score correlations. The pretest demonstrated a practice effect which appeared to be linearly related to ordinal position within a series, with a decrement of about .75 seconds for each additional item attempted in the average time required.

Three response formats were developed: (1) the Hidden Letter (FLT-HL) technique--requiring the examinees to actually trace the simple figure; (2) the Overprinted Letter (FLT-OL) method requiring the examinee to find the simple figure and then record on an answer sheet the letters which lie within the simple figure; and (3) the Direct Machine readable (FLT-DM) approach, requiring the subject to find the simple figure and then to darken all the response locations (bubbles) which are contained within it. In the DM approach, the test booklet itself is then separated into its component pages as machine-readable sheets. Unlike the other methods, there is no need for a separate answer sheet.

A total of 307 College students were tested; missing data on one or more variables reduced the number of usable cases to 252 (103 males and 149 females). All subjects took the PRFT and the GEFT and one version of the FLT. Subjects were randomly assigned one of the three FLT response formats.

Because of the consistent sex differences found in measures of field independence (Witkin, et al, 1971), all reliabilities were estimated separately for males and females. Cronbach's alpha coefficient was used to estimate reliability. In the case of the GEFT and FLT the parallel subscores were derived from the seaprately timed sections. For the PRFT, the scores on the eight separate trials served as parallel subscores. Correlations between all measures were computed within FLT response format groups for males and females.

All of the reliabilities were above .80, with a high of .91 for males using the DM format. The data suggested that any of the three response formats could be used to yield an acceptable reliability. The convergent and discriminant validity of the FLT was assessed to a limited extent. A construct-valid FLT would show relatively high relationships with GEFT and PRFT and relatively low relationships with SAT scores.

The pooled results showed a picture for FLT which was quite consistent with that shown for GEFT. The correlation between GEFT and FLT was .60 for males and .63 for females. The correlations between FLT and other variables showed a pattern similiar to the pattern for the GEFT, suggesting that the FLT closely parallels the GEFT. On the strength of these findings, the DM method was selected.

Appendix A shows an example of the test format and instructions for responding. The person taking the test is instructed to study a sample form, then to locate a corresponding form of the same size and shape inside a complex figure, and to darken all of the ovals contained within the matching portion.

Because there did appear to be some practice effect, the test was lengthened to 40 items, divided into three separately timed sections. The first section of 8 items is not scored. The second and third sections, with 16 items each, are scored one point if all of the circles in the matching portion have been darkened, and no circles outside that portion are so marked.

Although the development of the Figure Location Test was guided by the cognitive style theory, it is possible to view the Figure Location Test as simply a measure of a cognitive ability, which might improve prediction of academic or other performance, over that which could be obtained with the present GRE-Verbal and Quantitative Tests.

This project was undertaken to discover the strength of such relationships.

## Procedures

The Figure Location Test was administered as the experimental section of the GRE Aptitude Test in the October 1976 administration at approximately one-third of the test centers. These centers were chosen so as to provide a random sample of students taking the test in the United States.

About a month after the test administration, a questionnaire was sent to those students who completed the Figure Location Test. This questionnaire was designed primarily to get a permanent mailing address, but did contain some additional questions which had not been covered on the registration questionnaire. A duplicate questionnaire was sent a short time later to non-respondents. A copy is included in Appendix B. This questionnaire, as well as the one to be described below, was designed so that the computer could print the students' GRE registration number, in binary code, along with name and mailing address, directly on to the questionnaire, thus avoiding any problems of matching to other GRE test scores and questionnaire information. There were over 12,000 cases for whom

usable Figure Location Tests and registration questionnaires were available, and of these 8,000 responded to either the first or second request for a permanent mailing address. A second questionnaire was developed to obtain information about the students' graduate school program and his or her attitude toward it. The body of the questionnaire contained factual questions such as changes of major and grades received. It also contained questions related to attitudes toward the major selected, and some probes concerning underlying attitudes. Questions were included on sub-specialities within psychology and education, which were the only areas where the number of cases would seem to permit this kind of breakout. A copy is included in Appendix B.

This questionnaire was mailed in August 1978 to students who had furnished a mailing address in the earlier questionnaire, with a follow-up mailing to non-respondents in October 1978. These mailings included also the score received on the FLT, and an explanation of the project. About 5500 usable responses were received.

## Data Analyses

The initial data analysis involved the relationship of the Figure Location Test, the Graduate Records Examination Verbal and Quantitative Tests, and undergraduate major and proposed graduate major as reported on the GRE registration questionnaire. These analyses involved slightly more than 12,000 students.

### Intercorrelations

Table 1 shows the intercorrelations among the Figure Location Test and the GRE Aptitude Test scores, along with means and standard deviations, separately by sex and for the total group. Males in this sample scored slightly higher on the FLT than did females. However, this difference was less than the difference on the GRE Quantitative, where the males' mean score was one-half a standard deviation higher than that for females. On the GRE-Verbal the two groups had almost exactly equal mean scores.

The correlation of the FLT with the GRE-Quantitative was about equal to that between GRE-V and Q. The correlation between the FLT and GRE-V was substantially lower than the other coefficients. All three coefficients were slightly higher for the female sample than for the male sample. It appears that the FLT, while overlapping the other two measures, has additional independent variance.

Table 1

Intercorrelations and Means and Standard Deviations for Figure Location Test and GRE Aptitude Test Scores by Sex

| | Figure Location Test | GRE Verbal | GRE Quantitative |
|---|---|---|---|
| | | Males N = 6300 | |
| FLT | | .34 | .53 |
| GRE-V | | | .56 |
| Mean | 16.6 | 513.4 | 564.5 |
| Standard Deviation | 8.3 | 131.7 | 132.5 |
| | | Females N = 6381 | |
| FLT | | .38 | .57 |
| GRE-V | | | .61 |
| Mean | 15.7 | 513.1 | 492.7 |
| Standard Deviation | 7.7 | 127.4 | 126.2 |
| | | Total N = 12681 | |
| FLT | | .36 | .55 |
| GRE-V | | | .56 |
| Mean | 16.1 | 513.2 | 528.4 |
| Standard Deviation | 8.0 | 129.6 | 134.2 |

## Relationship With Major Field of Study

The questionnaire completed by most of those who registered in advance for the GRE Aptitude Test included questions asking for the student's undergraduate major and proposed graduate major. This permitted computation of mean FLT scores for each major field separately. Table 2 shows the means and standard deviations for the FLT and the GRE Aptitude Test scores for each of the undergraduate majors where the N was 200 or higher. (Mean scores for all undergraduate majors are shown in Appendix C-1.) As would be expected from previous research, those majoring in mathematics and chemistry, which emphasize abstract reasoning, had high mean scores on the FLT. Similarly, those majoring in "people related" fields, such as sociology, education, and nursing, had low mean scores. Psychology, which has some specialties emphasizing people relatedness and others closer to laboratory science, has a mean score exactly equal to the overall mean score.

Table 3 shows the means and standard deviations of the FLT and GRE Aptitude Test scores for those proposed graduate majors having 200 or more cases. (Mean scores for all proposed graduate majors are shown in Appendix C-2.) Veterinary medicine is the only "hard science" represented here, and has a score 2.5 points above the mean. Educational Administration, in contrast, has a mean score 3.5 points, almost half a standard deviation, below the overall mean. Guidance, Education, and Nursing also have mean scores below the overall mean, while Psychology again has a mean score almost exactly coinciding with the overall mean. Thus, it can be seen that the mean scores differ for both undergraduate and proposed graduate majors in the expected directions. The total FLT distribution is shown in Appendix C-3.

## Principal Data Analyses

The principal data analyses involved those students who responded to the questionnaires and for whom scores on the Figure Location Test and the GRE Verbal and Quantitative Test were available.

## Intercorrelations

Table 4 shows the intercorrelations among the three test scores, overall and major field graduate grade average as self-reported in the follow-up questionnaire, and major field and last two years undergraduate grade point average as self-reported in the registration questionnaire, along with means and standard deviations.

Table 2

Means and Standard Deviations of Figure Location Test and GRE-Aptitude Test for Undergraduate Majors with more than 200 Cases

| | | FLT | | GRE-V | | GRE-Q | |
|---|---|---|---|---|---|---|---|
| MAJOR AREA | N | Mean | SD | Mean | SD | Mean | SD |
| Agriculture | 223 | 16.4 | 7.7 | 452.9 | 115.0 | 550.5 | 110.2 |
| Biology | 794 | 17.9 | 7.6 | 536.6 | 109.7 | 579.0 | 111.0 |
| Business | 271 | 14.9 | 8.1 | 440.7 | 116.0 | 515.0 | 117.6 |
| Chemistry | 270 | 19.7 | 7.4 | 541.3 | 123.4 | 642.3 | 105.1 |
| Economics | 233 | 17.3 | 7.8 | 544.6 | 137.1 | 603.8 | 117.1 |
| Education | 927 | 13.6 | 7.4 | 448.2 | 110.2 | 441.1 | 110.4 |
| English | 620 | 15.2 | 7.6 | 599.6 | 121.3 | 496.5 | 118.5 |
| Government | 368 | 14.7 | 7.4 | 533.7 | 120.4 | 517.2 | 121.2 |
| History | 450 | 15.0 | 8.5 | 562.2 | 127.1 | 506.8 | 127.5 |
| Mathematics | 272 | 21.3 | 7.5 | 538.1 | 136.8 | 677.3 | 92.2 |
| Nursing | 247 | 13.6 | 7.6 | 504.5 | 96.8 | 471.2 | 106.4 |
| Psychology | 1300 | 16.1 | 7.4 | 546.4 | 113.9 | 536.4 | 115.0 |
| Sociology | 277 | 13.1 | 7.4 | 498.5 | 123.1 | 474.4 | 125.4 |

Table 3

Means and Standard Deviations of Figure Location Test and GRE-Aptitude Test for Intended Graduate Majors with more than 200 Cases

| | | FLT | | GRE-V | | GRE-Q | |
|---|---|---|---|---|---|---|---|
| MAJOR AREA | N | Mean | SD | Mean | SD | Mean | SD |
| Business | 267 | 16.6 | 7.6 | 476.4 | 129.0 | 558.4 | 120.1 |
| Education | 999 | 14.3 | 7.7 | 459.9 | 114.7 | 454.9 | 116.6 |
| Educational Administration | 265 | 12.6 | 7.8 | 446.8 | 116.3 | 446.8 | 138.8 |
| English | 309 | 15.8 | 7.6 | 617.7 | 111.1 | 505.2 | 122.6 |
| Guidance | 290 | 14.0 | 7.8 | 479.1 | 113.6 | 460.8 | 119.2 |
| History | 218 | 15.5 | 7.9 | 584.6 | 120.5 | 518.8 | 125.5 |
| Nursing | 232 | 14.3 | 7.8 | 513.2 | 100.5 | 481.1 | 108.7 |
| Psychology | 967 | 16.2 | 7.4 | 557.5 | 115.5 | 542.7 | 117.2 |
| Veterinary Medicine | 452 | 18.6 | 7.3 | 507.3 | 101.1 | 588.1 | 97.0 |

Table 4

Intercorrelations of Figure Location Test Scores,
Graduate Record Examination Verbal and Quantitative Test Scores and
Self-Reported Undergraduate and Graduate Grade Averages

N = 3,344

| | FLT | GRE-V | GRE-Q | Overall graduate grade average | Major field graduate grade average | Major field under-graduate grade average | Grade average last two undergraduate years |
|---|---|---|---|---|---|---|---|
| FLT | | .31 | .54 | .05 | .04 | .16 | .15 |
| GRE-V | | | .52 | .13 | .09 | .28 | .24 |
| GRE-Q | | | | .05 | .04 | .25 | .23 |
| Overall graduate grade average | | | | | .89 | .21 | .23 |
| Major field graduate grade average | | | | | | .18 | .20 |
| Major field undergraduate grade average | | | | | | | .70 |
| Mean | 18.3 | 544.8 | 562.0 | 6.7 | 6.9 | 5.6 | 5.6 |
| Standard Deviation | 7.5 | 120.9 | 127.8 | 1.1 | 1.2 | 1.1 | 1.0 |

The intercorrelations of the tests were slightly lower than those for the larger sample reported in Table 1. The lower correlations probably are due to the restricted range, which can be noted in the higher mean scores and smaller standard deviations. (As in other studies, persons with higher test scores are more likely to return questionnaires than are those with lower scores.) Correlations between all three tests and both graduate grade averages were very low. Correlations with the two undergraduate grade averages were higher for all three tests scores, with the FLT considerably lower than either the GRE-V or Q. Whatever is being measured by the Figure Location Test is less important to academic performance as reflected by grades than is either the GRE Verbal or Quantitative Test.

The unusually low correlation coefficients between grades and test scores are probably due to several factors. For one thing, these are self-reported grades, and some persons with low grades probably chose not to respond. More important, these grades come from many different departments and different schools, reflecting widely different standards of grading. Supplementary analyses concerning this are reported in Appendix D.

Relationship of Graduate Major to Figure Location Test and to Other Tests

Table 5 shows means and standard deviations for the Figure Location Test and the GRE-Verbal and Quantitative Tests for each graduate major having 30 or more cases.

Figure 1 shows the Figure Location Test score mean and the GRE-Quantitative score mean for those major fields with 30 or more students. As would be expected, physics, mathematics and computer sciences fall in the upper right quadrant, with high scores on both tests, since these fields require high mathematical ability and usually are not "people related." Geology, chemistry, electrical engineering, and biochemistry similarly fall in this quadrant, as seems reasonable from the nature of these fields. Medicine and architecture are also in this quadrant.

Those in "people related" fields such as education, social work, journalism, and speech, have low means on the FLT, and as can be seen in Figure 1, they tend to have low means on the GRE-Q also. The low mean FLT score for sociology majors could mean that those going into this field consider it to be "people-related" rather than an analytical scientific area.

Figure 2 shows the FLT means in relation to GRE-Verbal means for each major field with 30 or more students. Physics and medicine once again are in the upper right hand corner, with high mean scores

Table 5

Means and Standard Deviations of Figure Location Test, and GRE-Verbal and GRE-Quantitative Tests for Graduate Majors with more than 30 Cases

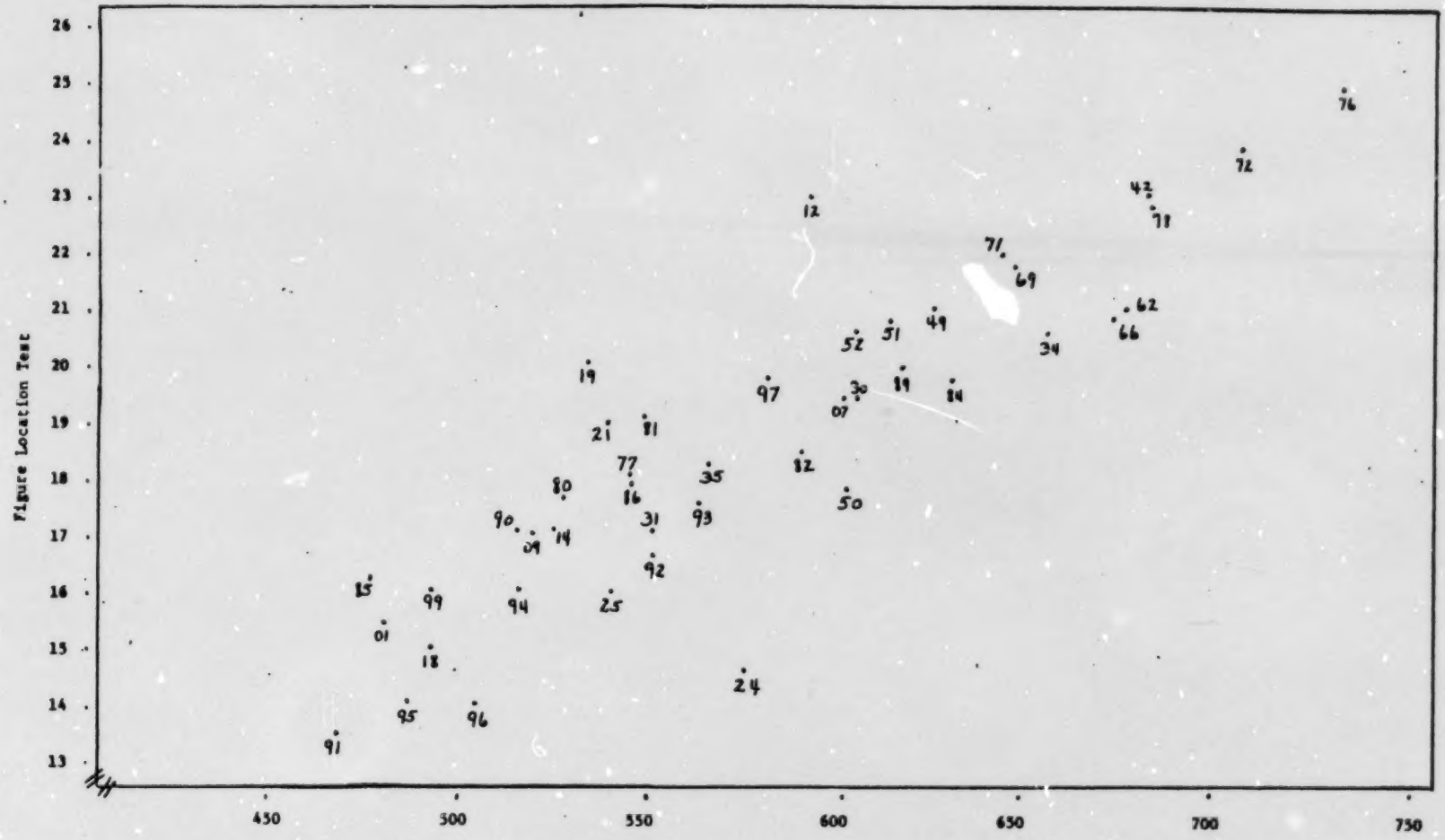
| MAJOR | ID | N | FLT | | GRE-V | | GRE-Q | |
|---|---|---|---|---|---|---|---|---|
| | | | Mean | SD | Mean | SD | Mean | SD |
| Agriculture | 31 | 65 | 17.2 | 7.2 | 459.2 | 119.2 | 551.1 | 88.6 |
| Anthropology | 81 | 33 | 19.1 | 8.1 | 602.2 | 88.9 | 547.8 | 145.9 |
| Architecture | 12 | 32 | 23.1 | 6.5 | 540.9 | 124.2 | 593.4 | 86.8 |
| Biochemistry | 34 | 52 | 20.6 | 6.9 | 588.6 | 105.5 | 657.4 | 79.4 |
| Biology | 35 | 75 | 18.4 | 6.6 | 544.0 | 127.5 | 565.5 | 112.5 |
| Business & Commerce | 82 | 153 | 18.6 | 7.6 | 519.5 | 114.7 | 591.6 | 117.4 |
| Chemistry | 62 | 75 | 21.1 | 7.0 | 560.7 | 100.2 | 678.2 | 94.2 |
| Computer Sciences | 78 | 67 | 23.0 | 7.2 | 575.0 | 152.4 | 685.0 | 105.9 |
| Economics | 84 | 62 | 19.8 | 7.3 | 572.6 | 129.8 | 631.1 | 109.9 |
| Education | 85 | 478 | 16.4 | 6.9 | 478.1 | 109.4 | 477.2 | 115.5 |
| Educational Administration | 01 | 101 | 15.5 | 7.5 | 465.1 | 111.2 | 480.7 | 120.3 |
| Educational Psychology | 09 | 43 | 17.2 | 6.6 | 533.2 | 113.8 | 519.6 | 114.8 |
| Electrical Engineering | 66 | 59 | 21.0 | 7.7 | 511.1 | 129.3 | 673.6 | 96.4 |
| English | 14 | 94 | 17.2 | 7.9 | 636.6 | 120.7 | 525.8 | 129.3 |
| Geology | 71 | 52 | 22.0 | 6.9 | 581.6 | 106.6 | 644.7 | 84.0 |
| Guidance & Counseling | 99 | 135 | 16.0 | 7.9 | 515.1 | 113.0 | 494.2 | 117.7 |
| History | 86 | 68 | 18.0 | 7.8 | 601.4 | 115.3 | 545.8 | 124.2 |
| Hospital & Health Sciences | 25 | 54 | 16.0 | 7.6 | 528.2 | 105.8 | 540.6 | 122.7 |
| Journalism | 18 | 43 | 15.1 | 7.0 | 552.5 | 144.2 | 493.9 | 136.9 |
| Law | 89 | 88 | 20.0 | 7.4 | 619.1 | 112.5 | 617.3 | 110.0 |
| Library Science | 90 | 88 | 17.2 | 7.2 | 594.4 | 122.5 | 514.1 | 118.2 |

Table 5 (Continued)

| MAJOR | ID | N | FLT Mean | FLT SD | GRE-V Mean | GRE-V SD | GRE-Q Mean | GRE-Q SD |
|---|---|---|---|---|---|---|---|---|
| Mathematics | 72 | 43 | 24.0 | 5.6 | 555.9 | 112.3 | 708.5 | 86.3 |
| Medicine | 42 | 65 | 23.1 | 7.2 | 640.9 | 90.2 | 683.4 | 83.2 |
| Microbiology | 07 | 32 | 19.5 | 6.8 | 513.7 | 89.3 | 601.1 | 97.1 |
| Music | 19 | 57 | 20.1 | 7.5 | 534.2 | 122.0 | 521.2 | 113.5 |
| Nursing | 43 | 100 | 16.2 | 7.0 | 536.0 | 93.2 | 498.3 | 93.4 |
| Nutrition | 77 | 36 | 18.1 | 7.5 | 515.9 | 115.7 | 545.8 | 115.8 |
| Other Biological Sciences | 30 | 72 | 19.5 | 8.2 | 551.6 | 120.0 | 605.8 | 112.1 |
| Other Engineering | 69 | 39 | 21.9 | 6.5 | 534.3 | 115.0 | 647.1 | 92.6 |
| Other Social Sciences | 80 | 96 | 17.7 | 7.6 | 512.7 | 112.0 | 527.2 | 113.4 |
| Physical Education | 91 | 31 | 13.5 | 7.1 | 428.8 | 86.7 | 468.2 | 112.1 |
| Physics | 76 | 49 | 25.0 | 4.9 | 651.9 | 93.2 | 735.5 | 65.5 |
| Physiology | 49 | 33 | 21.1 | 6.6 | 561.4 | 87.8 | 626.1 | 94.8 |
| Political Science | 92 | 43 | 16.7 | 8.6 | 587.5 | 142.6 | 551.2 | 128.7 |
| Psychology | 93 | 281 | 17.6 | 6.9 | 585.2 | 114.5 | 565.0 | 108.1 |
| Publication Administration | 94 | 99 | 16.1 | 7.0 | 535.7 | 115.3 | 515.5 | 111.4 |
| Public Health | 50 | 33 | 17.9 | 6.9 | 567.2 | 108.4 | 603.2 | 111.8 |
| Religious Studies or Religion | 21 | 70 | 19.2 | 7.2 | 545.5 | 122.9 | 539.5 | 111.1 |
| Social Work | 95 | 96 | 14.1 | 6.7 | 526.1 | 114.4 | 487.2 | 107.0 |
| Sociology | 96 | 30 | 14.0 | 7.7 | 535.2 | 131.4 | 504.1 | 120.1 |
| Speech | 24 | 45 | 14.7 | 7.6 | 493.1 | 109.0 | 476.4 | 98.6 |
| Urban Development | 97 | 43 | 19.8 | 7.3 | 604.7 | 101.2 | 582.6 | 107.6 |
| Veterinary Medicine | 51 | 124 | 20.8 | 6.2 | 534.8 | 103.7 | 614.5 | 86.6 |
| Zoology | 52 | 35 | 20.7 | 6.5 | 571.4 | 98.9 | 605.0 | 73.8 |

Figure 1

Relationship of Figure Location Test and GRE - Quantitative Scores by Graduate Major

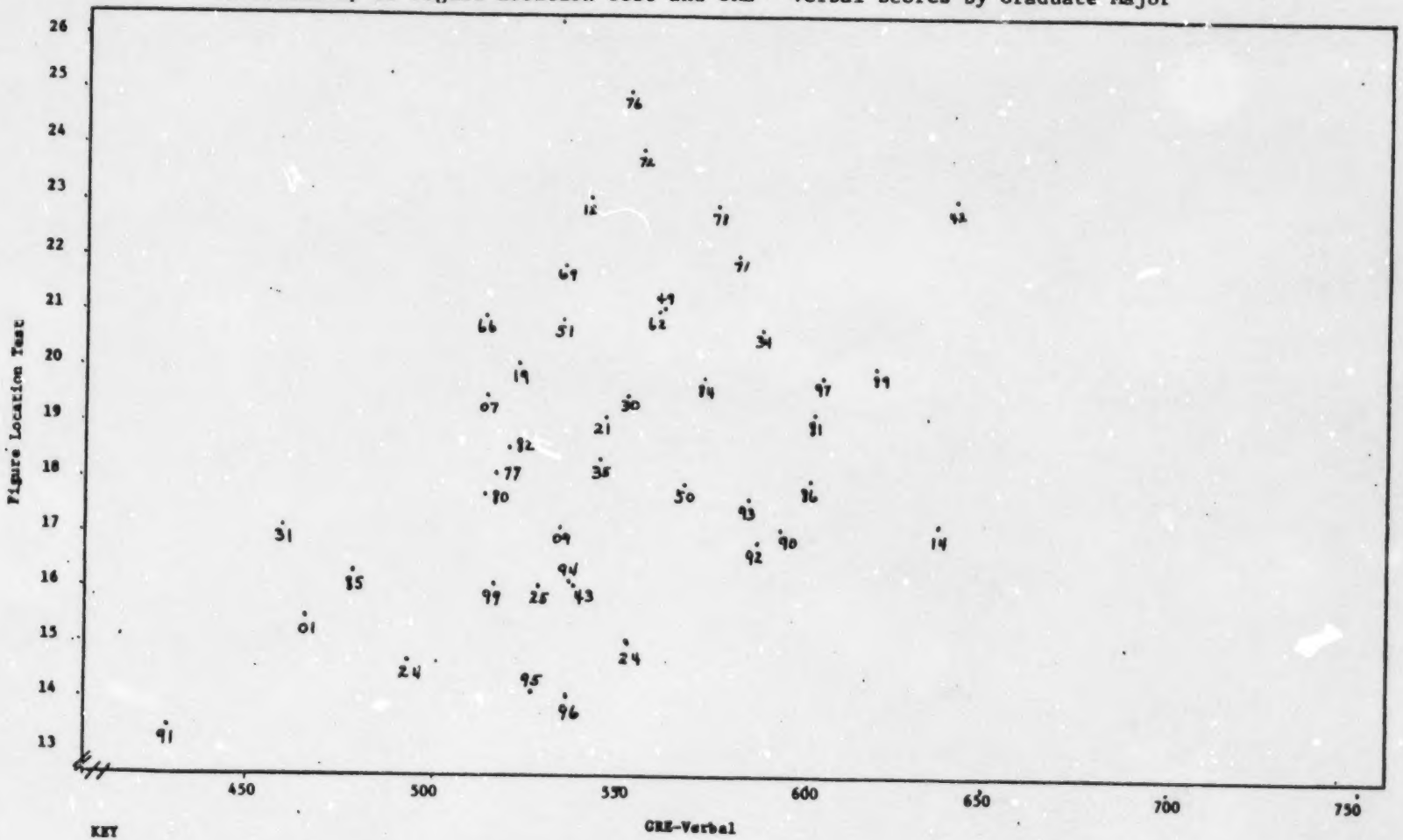



KEY

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 01 | Educational Administration | 34 | Biochemistry | 72 | Mathematics | 91 | Physical Education |
| 07 | Microbiology | 35 | Biology | 76 | Physics | 92 | Political Science |
| 09 | Educational Psychology | 42 | Medicine | 77 | Nutrition | 93 | Psychology |
| 12 | Architecture | 43 | Nursing | 78 | Computer Sciences | 94 | Public Administration |
| 14 | English | 49 | Physiology | 80 | Other Social Sciences | 95 | Social Work |
| 18 | Journalism | 50 | Public Health | 81 | Anthropology | 96 | Sociology |
| 19 | Music | 51 | Veterinary Medicine | 82 | Business and Commerce | 97 | Urban Development |
| 21 | Religious Studies or Religion | 52 | Zoology | 84 | Economics | 99 | Guidance and Counseling |
| 24 | Speech | 62 | Chemistry | 85 | Education | | |
| 25 | Hospital and Health Sciences | 66 | Electrical Engineering | 86 | History | | |
| 30 | Other Biological Sciences | 69 | Other Engineering | 89 | Law | | |
| 31 | Agriculture | 71 | Geology | 90 | Library Science | | |

Figure 2

Relationship of Figure Location Test and GRE - Verbal Scores by Graduate Major




KEY

01 Educational Administration
07 Microbiology
09 Educational Psychology
12 Architecture
14 English
18 Journalism
19 Music
21 Religious Studies or Religion
24 Speech
25 Hospital and Health Sciences
30 Other Biological Sciences
31 Agriculture
34 Biochemistry
35 Biology
42 Medicine
43 Nursing
49 Physiology
50 Public Health
51 Veterinary Medicine
52 Zoology
62 Chemistry
66 Electrical Engineering
69 Other Engineering
71 Geology
72 Mathematics
76 Physics
77 Nutrition
78 Computer Sciences
80 Other Social Sciences
81 Anthropology
82 Business and Commerce
84 Economics
85 Education
86 History
89 Law
90 Library Science
91 Physical Education
92 Political Science
93 Psychology
94 Public Administration
95 Social Work
96 Sociology
97 Urban Development
99 Guidance and Counseling

on both tests. Mathematics, architecture, and computer sciences, with around average mean scores on GRE-Verbal, moved out of the upper right corner. In the lower left quadrant, physical education, agriculture, education administration, education, and speech all have relatively low means on both tests. As noted earlier, social work, sociology, and journalism have low FLT means but since the GRE-V means fall close to the overall mean, they have moved out of the lower left quadrant.

Value Preferences and Personality Factors

A substantial portion of the follow-up questionnaire was devoted to questions or scales concerning personal values and personality factors.

Table 6 shows, for students who did not change majors, the values which governed their choice. For those who considered "People Oriented" to be a strong factor in their choice, all three test means were comparatively low, while for those who said it was "Little or no consideration" the three test means were comparatively high. In contrast, for those who reported "Theoretical Emphasis" to be a strong factor, all three test means are comparatively high, while for those who considered it unimportant the test means are comparatively low. FLT scores do not appear to be related to the three other characteristics in this section of the questionnaire. The GRE-V and Q means do relate to responses on several of these, sometimes in opposite fashions.

Table 7 shows, for the approximately 15 percent who reported that they had changed majors, the responses on the importance of several factors in relation to mean test scores. In this table, a seven step scale has been reduced to 5 steps by combining the two extreme positions on each end of the scale.

The very small number of persons who reported that their new major was less people centered had high FLT and GRE-V means and a relatively high GRE-Q mean. The FLT apparently had no relationship to responses to the other item scales.

Table 8 shows the responses to item scales concerning career goals in relation to test scores. Again a seven-point scale has been compressed to five steps.

There was a clear relationship between the responses to "intellectuality" and all three test means. Those who felt this characteristic was very important had higher scores on all three tests than did those who felt that it was not important. In contrast, those who felt "leadership" to be very important had low scores on all

Table 6

The FLT, GRE-Verbal, and GRE-Quantitative Test Means for Responses to Item Scales that Characterize Reasons for Choice of Graduate Major

| | | Strong Factor | Moderate Factor | Little or No Consideration | No Response |
|---|---|---|---|---|---|
| People Oriented | N | 1878 | 875 | 847 | 1778 |
| | FLT Mean | 16.86 | 18.77 | 20.76 | 18.85 |
| | GRE-V Mean | 524.92 | 543.15 | 574.81 | 543.59 |
| | GRE-Q Mean | 520.90 | 573.49 | 628.60 | 558.87 |
| Theoretical Emphasis | N | 808 | 1507 | 1253 | 1810 |
| | FLT Mean | 19.38 | 18.01 | 17.95 | 18.73 |
| | GRE-V Mean | 567.89 | 535.62 | 532.62 | 542.01 |
| | GRE-Q Mean | 593.38 | 554.86 | 545.41 | 556.42 |
| Highly Structured | N | 471 | 1174 | 1902 | 1831 |
| | FLT Mean | 18.41 | 17.97 | 18.48 | 18.72 |
| | GRE-V Mean | 514.77 | 517.74 | 563.43 | 542.05 |
| | GRE-Q Mean | 570.88 | 554.48 | 561.64 | 556.01 |
| Opportunity to Contribute New Knowledge | N | 1927 | 1255 | 421 | 1775 |
| | FLT Mean | 18.58 | 17.85 | 18.33 | 18.74 |
| | GRE-V Mean | 535.44 | 543.91 | 562.30 | 542.70 |
| | GRE-Q Mean | 566.20 | 552.09 | 554.16 | 557.12 |
| Opportunity for Achievement through One's Effort | N | 2529 | 830 | 239 | 1780 |
| | FLT Mean | 18.34 | 18.08 | 18.64 | 18.74 |
| | GRE-V Mean | 538.25 | 548.94 | 551.84 | 542.53 |
| | GRE-Q Mean | 560.33 | 556.13 | 569.54 | 556.94 |
| Rewards Based on Outstanding Achievements | N | 859 | 1537 | 1166 | 1816 |
| | FLT Mean | 18.31 | 18.41 | 18.15 | 18.72 |
| | GRE-V Mean | 535.51 | 536.71 | 552.02 | 542.87 |
| | GRE-Q Mean | 563.88 | 563.48 | 552.91 | 556.72 |
| Emphasizes the Use of Intellectual Skills | N | 2052 | 1261 | 283 | 1782 |
| | FLT Mean | 18.89 | 17.27 | 18.48 | 18.75 |
| | GRE-V Mean | 556.57 | 523.34 | 515.08 | 542.45 |
| | GRE-Q Mean | 576.36 | 536.63 | 545.04 | 556.97 |

Table 7

The FLT, GRE-Verbal and GRE-Quantitative Test Means for Responses to Item Scales that Characterize Reasons for Changes in Graduate Major

| | More People Centered | | Neutral | | Less People Centered | No Response |
|---|---|---|---|---|---|---|
| N | 327 | 76 | 285 | 51 | 43 | 4596 |
| FLT Mean | 18.40 | 18.32 | 18.40 | 18.69 | 20.09 | 18.44 |
| GRE-V Mean | 537.25 | 536.99 | 541.01 | 579.21 | 612.31 | 541.61 |
| GRE-Q Mean | 564.46 | 555.39 | 540.41 | 583.53 | 583.88 | 559.44 |
| | **More Popular** | | **Neutral** | | **Less Popular** | **No Response** |
| N | 169 | 98 | 366 | 65 | 77 | 4603 |
| FLT Mean | 17.31 | 19.24 | 18.81 | 19.71 | 17.48 | 18.43 |
| GRE-V Mean | 507.51 | 511.35 | 559.69 | 570.94 | 554.30 | 541.64 |
| GRE-Q Mean | 540.71 | 550.00 | 565.94 | 576.88 | 530.85 | 559.43 |
| | **Emphasizes Intellectual Skills** | | **Neutral** | | **Emphasizes Practical Skills** | **No Response** |
| N | 241 | 63 | 235 | 83 | 144 | 4612 |
| FLT Mean | 18.83 | 17.40 | 18.90 | 19.24 | 17.49 | 18.43 |
| GRE-V Mean | 552.75 | 518.38 | 546.09 | 542.17 | 538.92 | 541.55 |
| GRE-Q Mean | 557.59 | 543.68 | 565.04 | 564.52 | 547.93 | 559.18 |
| | **More Narrowly Defined** | | **Neutral** | | **More Inclusive** | **No Response** |
| N | 168 | 74 | 186 | 66 | 282 | 4602 |
| FLT Mean | 18.30 | 19.74 | 18.15 | 17.88 | 18.53 | 18.44 |
| GRE-V Mean | 534.84 | 540.49 | 529.71 | 540.30 | 560.14 | 541.53 |
| GRE-Q Mean | 538.89 | 564.58 | 557.93 | 551.81 | 564.37 | 559.36 |

Table 7 (cont'd)

| | More Challenging | | Neutral | | Less Challenging | No Response |
|---|---|---|---|---|---|---|
| N | 427 | 85 | 225 | 21 | 23 | 4597 |
| FLT Mean | 18.47 | 18.13 | 18.90 | 17.67 | 20.29 | 18.43 |
| GRE-V Mean | 542.81 | 520.82 | 554.82 | 571.96 | 553.10 | 541.56 |
| GRE-Q Mean | 550.08 | 554.34 | 571.12 | 566.34 | 577.67 | 559.40 |

Table 8

The FLT, GRE-Verbal, and GRE-Quantitative Test Means for Responses to Item Scales that Characterizes the Importance of Certain values in Relationship to the Respondent's Career Goals

| | | Important | | | Unimportant | | |
|---|---|---|---|---|---|---|---|
| | | Very | Moderately | Neutral | Moderately | Very | No response |
| Intellectuality | N | 2605 | 1142 | 740 | 327 | 347 | 217 |
| Dealing with abstractions or theories | FLT | 19.55 | 18.20 | 17.24 | 16.50 | 15.57 | 17.13 |
| | GRE-V | 564.19 | 537.00 | 502.09 | 519.82 | 508.12 | 530.46 |
| | GRE-Q | 581.28 | 552.84 | 518.09 | 544.49 | 515.81 | 544.82 |
| Productivity | N | 4390 | 515 | 195 | 72 | 92 | 114 |
| Getting things done, smoothly and well | FLT | 18.47 | 19.27 | 18.20 | 19.53 | 17.71 | 17.33 |
| | GRE-V | 537.65 | 578.90 | 590.19 | 620.11 | 570.30 | 522.63 |
| | GRE-Q | 558.74 | 580.62 | 583.38 | 596.84 | 541.34 | 549.21 |
| Aesthetics | N | 2474 | 1133 | 840 | 377 | 443 | 111 |
| Dealing with the beautiful, attractive | FLT | 18.67 | 18.64 | 17.96 | 17.64 | 18.28 | 17.34 |
| | GRE-V | 548.11 | 533.11 | 536.78 | 544.51 | 539.84 | 520.56 |
| | GRE-Q | 550.89 | 560.06 | 566.09 | 574.11 | 570.43 | 549.64 |
| Altruism | N | 3285 | 890 | 567 | 249 | 273 | 114 |
| Helping others, particularly those in need | FLT | 17.83 | 19.41 | 19.66 | 20.29 | 19.71 | 18.25 |
| | GRE-V | 529.16 | 558.27 | 563.98 | 579.06 | 597.98 | 525.67 |
| | GRE-Q | 543.14 | 582.88 | 591.83 | 594.42 | 605.07 | 553.75 |
| Leadership | N | 2710 | 1070 | 734 | 333 | 421 | 110 |
| Directing the activities of a group | FLT | 17.70 | 18.94 | 19.05 | 19.07 | 20.19 | 18.25 |
| | GRE-V | 519.12 | 550.80 | 558.77 | 580.69 | 605.61 | 522.03 |
| | GRE-Q | 539.40 | 569.24 | 574.55 | 586.49 | 605.78 | 553.86 |
| Integration | N | 3955 | 578 | 406 | 114 | 205 | 120 |
| Achieving a sense of personal oneness or wholeness | FLT | 18.23 | 19.00 | 19.02 | 19.96 | 19.66 | 18.09 |
| | GRE-V | 536.80 | 534.57 | 547.99 | 582.12 | 579.15 | 532.59 |
| | GRE-Q | 551.03 | 573.98 | 591.67 | 630.78 | 602.57 | 557.09 |

three tests. The relation of FLT means, as well as the GRE-V and Q, to other characteristics is less clear-cut. Responses to "integration" do have some relationship, with higher means obtained by those who felt that this characteristic was moderately or very unimportant.

Table 9 shows the mean test scores associated with responses to questions relating to self-concept. Again, for convenience in presentation, a seven-step scale has been reduced to five steps by combining the two extreme positions at each end of the scale.

The FLT means have a clear relationship to responses on the "outgoing reserved" dimension, with those responding at the "reserved" end having the highest scores. This was true also for the two other test scores. The FLT means also are related to responses on the "teacher-researcher" dimension, with the highest scores obtained by those who responded at the "researcher" pole. GRE-Q means followed the same pattern. GRE-V varied in the same direction, but the relationship is not as strong.

A very small proportion responded to the "common" end of the "unique-common" dimension, but those who did had very low mean scores on all three tests. Most students apparently consider themselves unique. There was a slight association between scores on the three tests and responses on the "concentrated-distractible" scale, with higher test means at the "distractible" end.

The "confident-diffident" scale responses were associated with scores on the GRE-V and Q, and slightly associated with scores on the FLT. Those responding at the "diffident" end had higher scores on the GRE-V and Q, and lower scores on the FLT. The "easygoing-intense" scale is related to scores on the GRE-V, but not to the FLT, as is the "liberal-conservative" dimension, and the "thinker-doer" scale.

Thus, it appears that the Figure Location Test does relate to several of the attitude and personality scales. However, usually one or both of the GRE aptitude tests also relate to these scales. To test how much independent relationship there might be, correlation coefficients were computed between each of the scales and the Figure Location Test, and partial correlation coefficients were computed with the effects of GRE-V and Q removed. These values are shown in Table 10. Both zero-order and partial correlation coefficients are low. After the GRE-V and Q have been partialed out, no coefficient is higher than .09, and most are much lower.

Table 9

The FLT, GRE-Verbal and GRE-Quantitative Test Means for Responses to Item Scales Related to Self-Concept

| | Easygoing | | Neutral | | Intense | No Response |
|---|---|---|---|---|---|---|
| N | 1722 | 838 | 744 | 860 | 1065 | 149 |
| FLT Mean | 18.11 | 18.66 | 18.65 | 18.53 | 18.43 | 16.83 |
| GRE-V Mean | 507.57 | 531.67 | 544.58 | 562.89 | 583.98 | 517.95 |
| GRE-Q Mean | 546.72 | 559.30 | 560.76 | 558.99 | 568.98 | 532.92 |
| | **Leader** | | **Neutral** | | **Follower** | **No Response** |
| N | 2568 | 1217 | 939 | 385 | 167 | 102 |
| FLT Mean | 18.22 | 18.75 | 18.28 | 18.83 | 18.57 | 17.69 |
| GRE-V Mean | 533.75 | 541.45 | 547.94 | 555.77 | 543.00 | 527.20 |
| GRE-Q Mean | 550.18 | 563.64 | 564.42 | 566.96 | 554.58 | 547.24 |
| | **Liberal** | | **Neutral** | | **Conservative** | **No Response** |
| N | 2052 | 1004 | 918 | 645 | 633 | 126 |
| FLT Mean | 18.45 | 18.69 | 18.25 | 18.61 | 18.09 | 17.23 |
| GRE-V Mean | 567.60 | 535.46 | 529.34 | 524.40 | 518.23 | 528.90 |
| GRE-Q Mean | 561.12 | 556.18 | 555.88 | 563.18 | 553.59 | 542.64 |
| | **Outgoing** | | **Neutral** | | **Reserved** | **No Response** |
| N | 2133 | 1057 | 754 | 779 | 549 | 106 |
| FLT Mean | 17.80 | 18.35 | 18.32 | 19.45 | 19.33 | 17.25 |
| GRE-V Mean | 526.67 | 535.81 | 536.98 | 560.55 | 578.49 | 528.09 |
| GRE-Q Mean | 537.53 | 554.57 | 562.17 | 582.61 | 590.18 | 541.27 |
| | **Liked** | | **Neutral** | | **Disliked** | **No Response** |
| N | 3747 | 1008 | 447 | 43 | 27 | 106 |
| FLT Mean | 18.09 | 18.72 | 17.99 | 21.60 | 16.62 | 17.08 |
| GRE-V Mean | 531.49 | 553.64 | 551.81 | 624.06 | 576.34 | 525.80 |
| GRE-Q Mean | 545.90 | 574.43 | 565.43 | 630.34 | 584.33 | 528.05 |

Table 9 (cont'd)

| | Teacher | | Neutral | | Researcher | No Response |
|---|---|---|---|---|---|---|
| N | 2050 | 736 | 1272 | 461 | 713 | 146 |
| FLT Mean | 17.11 | 18.54 | 19.20 | 19.84 | 19.88 | 17.84 |
| GRE-V Mean | 521.38 | 546.76 | 556.16 | 558.11 | 556.07 | 538.58 |
| GRE-Q Mean | 522.14 | 564.94 | 582.84 | 592.26 | 592.42 | 546.23 |
| | **Unique** | | **Neutral** | | **Common** | **No Response** |
| N | 2987 | 1210 | 767 | 215 | 81 | 118 |
| FLT Mean | 18.90 | 18.47 | 17.56 | 17.04 | 15.25 | 17.61 |
| GRE-V Mean | 557.49 | 532.92 | 520.32 | 490.22 | 478.78 | 534.55 |
| GRE-Q Mean | 564.96 | 558.30 | 546.30 | 542.22 | 508.65 | 556.41 |
| | **Concentrated** | | **Neutral** | | **Distractible** | **No Reponse** |
| N | 2130 | 1204 | 941 | 598 | 384 | 121 |
| FLT Mean | 18.42 | 18.28 | 18.30 | 18.92 | 19.39 | 17.23 |
| GRE-V Mean | 547.29 | 529.77 | 531.91 | 557.28 | 573.40 | 519.07 |
| GRE-Q Mean | 556.76 | 556.18 | 553.37 | 573.89 | 575.56 | 531.21 |
| | **Confident** | | **Neutral** | | **Diffident** | **No Response** |
| N | 2891 | 1287 | 637 | 305 | 149 | 109 |
| FLT Mean | 18.50 | 18.43 | 18.07 | 18.05 | 17.74 | 17.55 |
| GRE-V Mean | 535.37 | 540.67 | 549.87 | 565.22 | 577.13 | 528.12 |
| GRE-Q Mean | 555.41 | 560.08 | 557.12 | 561.97 | 578.19 | 544.81 |
| | **Thinker** | | **Neutral** | | **Doer** | **No Response** |
| N | 1334 | 840 | 1571 | 701 | 784 | 148 |
| FLT Mean | 18.16 | 19.08 | 19.03 | 18.11 | 17.10 | 18.05 |
| GRE-V Mean | 551.47 | 551.67 | 551.38 | 525.54 | 507.51 | 530.19 |
| GRE-Q Mean | 554.90 | 573.89 | 570.43 | 551.79 | 523.13 | 552.40 |

TABLE 10

Correlations between Questionnaire Responses
and Figure Location Test and Correlations
with effects of GRE Verbal and Quantitative partialed out

| Question Number | Question | Zero Order Correlations with FLT | Partial Correlation with GRE V and Q removed |
|---|---|---|---|
| 7. | If you did not change majors, please characterize the values that governed your choice of major field. | | |
| 7-a | Is people-oriented | .21 | .04 |
| 7-b | Has a theoretical emphasis | -.07 | .01 |
| 7-c | Is highly structured | .02 | .02 |
| 7-d | Gives opportunity to contribute new knowledge | -.03 | -.01 |
| 7-e | Gives opportunity to achieve through one's own efforts | -.00 | -.01 |
| 7-f | Rewards are based on outstanding achievements | -.01 | .01 |
| 7-g | Emphasizes the use of intellectual skills | -.07 | .00 |
| 9. | If you changed majors, please characterize the rationale for that change by using the scales below. Use the midpoint as a neutral position or when you are uncertain. Indicate degrees of appropriateness by blackening oval 1, 2 or 3 in the appropriate direction. My new major is: | | |
| 9-a | More people centered/less people centered | .04 | .04 |
| 9-b | Emphasizes my intellectual skills/ Emphasizes my practical skills | -.04 | -.04 |
| 9-c | More popular/less popular | .04 | .03 |
| 9-d | More narrowly defined/more br dly inclusive | -.01 | -.04 |
| 9-e | More challanging/less challanging | .05 | -.00 |
| 14 | Which of the following have you done during the current academic year? | | |
| 14-1 | Attended one or more meetings of a scholarly or professional society | -.08 | -.04 |
| 14-2 | Subscribed to two or more scholarly or professional journals. | -.09 | -.05 |
| 14-3 | Been author or coauthor of a scientific paper which was accepted for presentation at a professional meeting | .04 | .01 |

Table 10 (cont'd)

| Question Number | Question | Zero Order Correlations with FLT | Partial Correlation with GRE V and Q removed |
|---|---|---|---|
| 14-4 | Been author or coauthor of a scientific paper which was submitted for publication to a professional journal | .01 | -.03 |
| 14-5 | Been author or coauthor of a scientific paper which was accepted for publication by a scholarly or professional journal | .04 | -.00 |
| 14-6 | Prepared a detailed proposal or plan for a dissertation, master's thesis, or other major research project | -.05 | -.03 |
| 14-7 | Conducted an independent research project | -.03 | -.03 |
| 14-8 | Conducted a research project in collaboration with another student or faculty member | .06 | -.02 |
| 14-9 | Taught a section of an undergraduate course | .02 | -.03 |
| 14-10 | Taught a section of an undergraduate class on one or several occasions | .03 | .00 |
| 14-11 | Frequently advised or tutored other graduate students on technical or statistical problems | .05 | -.02 |
| 14-12 | Assisted in editing of text or preparation of bibliographic material for a publication | .03 | .00 |
| 14-13 | Designed and built a piece of laboratory equipment | .08 | -.00 |
| 14-14 | Learned to operate or maintain a piece of electronic equipment | .05 | -.01 |
| 14-15 | Programmed a computer to analyze research data | .07 | -.03 |
| 14-16 | Held a student government office | -.01 | -.02 |
| 15 | Please evaluate each of the following values with respect to its importance to you in shaping your life's work | | |
| 15-a | Intellectuality. Dealing with abstractions, theory | -.16 | -.08 |
| 15-b | Productivity. Getting things done, smoothly and well | .03 | -.03 |
| 15-c | Aesthetics. Dealing with the beautiful, attractive or harmonious in life | -.03 | -.09 |
| 15-d | Altruism. Helping others, particularly those in need | .13 | .02 |
| 15-e | Leadership. Directing the activities of a group | .11 | .01 |
| 15-f | Integration. Achieving a sense of personal oneness or wholeness | .06 | -.02 |

Table 10 (cont'd)

| Question Number | Question | Zero Order Correlations with FLT | Partial Correlation with GRE V and Q removed |
|---|---|---|---|
| 16 | Will you please characterize yourself on the following scales? Use the midpoint as a neutral position or when you are uncertain | | |
| 16-a | Easygoing/Intense | .02 | -.03 |
| 16-b | Leader/Follower | .02 | -.01 |
| 16-c | Liberal/Conservative | -.01 | -.00 |
| 16-d | Outgoing/Reserved | .08 | -.00 |
| 16-e | Liked/Disliked | .03 | -.03 |
| 16-f | Teacher/Researcher | .15 | .03 |
| 16-g | Unique/Common | -.08 | -.05 |
| 16-h | Concentrated/Distractable | .02 | -.00 |
| 16-i | Confident/Diffident | -.02 | -.04 |
| 16-j | Thinker/Doer | -.03 | .00 |

Relations Between Major Fields and Figure Location Test, With Effects of Other Tests Considered

Two approaches were used in considering the effect of the GRE-V and Q on the relationship of the Figure Location Test to choice of major. First, a covariance analysis was used to partial the effects of GRE-V and Q from Figure Location Test mean scores for those majors with 30 or more cases. These adjusted means are shown in Table 11. Music, hospital administration, and social work are the only instances where the adjusted mean for those choosing that major differed by more than 1.5 points from the "all other" category. Because of the large number of cases in the "all other" category, all differences are statistically significant but mean differences lower than 1.5 would not be practically important.

The second approach was to compute multiple correlations between the Figure Location Test, on the one hand, and the GRE-V and Q scores alone, and the GRE-V and Q with choice of major included as a dummy variable. These values are shown in Table 12. Music, geology, and social work are the only instances where the addition of the major field improved the correlation by as much as .02.

Analysis of the psychology and education sub-fields did not appear to be particularly productive and will not be reported here.

Stepwise Discriminant Function Analyses

For those students who reported that they had not changed majors, two discriminant function analyses were undertaken including the Figure Location Test and five other variables which related to choice of majors. The variables included GRE-V and Q, Question 7A (choice of major people related), Question 7B (choice of major for theoretical emphasis) and undergraduate grade point average. One analysis included the individual major fields, the second analysis included grouping of majors into nine Discipline Groups.

In the first analysis, GRE-V and Q, Questions 7A and 7B were selected and the Figure Location Test and undergraduate grade point average were not. The first three functions accounted for 94.5 percent of the variance between groups and the fourth function accounted for the remaining 5.5 percent.

In the second analysis, the Figure Location Test was again not selected while the other five variables were. Here the first two functions accounted for 91.5 percent of the variance and the third accounted for an additional seven percent. These analyses provide

TABLE 11

Figure Location Test Mean Scores and adjusted Mean Scores, with effects of GRE-V and Q removed by covariance, by graduate major field

| | GRE-V | | GRE-Q | | FLT | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | Major | | All Other | |
| | Major | All Other | Major | All Other | Actual | Adjusted | Actual | Adjusted |
| Educational Administration | 465.117 | 543.387 | 480.727 | 560.467 | 15.505 | 18.063 | 18.500 | 18.452 |
| English | 636.581 | 540.233 | 525.787 | 559.560 | 17.202 | 18.035 | 18.466 | 18.451 |
| Music | 534.235 | 541.999 | 521.184 | 559.375 | 20.088 | 21.271 | 18.427 | 18.414 |
| Religion | 545.497 | 541.870 | 539.494 | 559.227 | 19.200 | 19.795 | 18.434 | 18.426 |
| Hospital Administration | 528.196 | 542.056 | 540.576 | 559.156 | 16.037 | 16.630 | 18.469 | 18.463 |
| Other biological science | 551.599 | 541.785 | 605.765 | 558.335 | 19.486 | 18.023 | 18.430 | 18.450 |
| Agriculture | 459.186 | 542.929 | 551.088 | 559.066 | 17.169 | 17.565 | 18.460 | 18.455 |
| Biochemistry | 588.585 | 541.461 | 657.369 | 558.009 | 20.635 | 17.504 | 18.423 | 18.453 |
| Biology | 544.028 | 541.887 | 565.493 | 558.878 | 18.373 | 18.168 | 18.445 | 18.448 |
| Medicine | 640.861 | 540.706 | 683.348 | 557.448 | 23.138 | 19.120 | 18.387 | 18.436 |
| Nursing | 536.031 | 542.028 | 498.312 | 560.119 | 16.150 | 18.030 | 18.488 | 18.452 |
| Veterinary Medicine | 534.806 | 542.085 | 614.474 | 557.660 | 20.823 | 19.129 | 18.388 | 18.428 |
| Chemistry | 560.704 | 541.651 | 678.199 | 557.284 | 21.107 | 17.377 | 18.407 | 18.459 |

TABLE 11 (Cont'd)

Figure Location Test Mean Scores and adjusted Mean Scores, with effects of GRE-V and Q removed by covariance, by graduate major field

| Major | GRE-V | | GRE-Q | | FLT | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | Major | | All Other | |
| | Major | All Other | Major | All Other | Actual | Adjusted | Actual | Adjusted |
| Electrical Engineering | 511.117 | 542.258 | 673.610 | 557.698 | 20.966 | 17.472 | 18.416 | 18.455 |
| Geology | 581.600 | 541.529 | 644.735 | 558.133 | 22.038 | 19.320 | 18.409 | 18.436 |
| Computer Science | 574.961 | 541.500 | 684.992 | 557.380 | 22.955 | 19.011 | 18.387 | 18.437 |
| Other Social Science | 512.675 | 542.448 | 527.217 | 559.547 | 17.740 | 18.776 | 18.457 | 18.438 |
| Business and Commerce | 519.469 | 542.574 | 591.620 | 558.014 | 18.575 | 17.606 | 18.440 | 18.469 |
| Economics | 572.590 | 541.559 | 631.111 | 631.111 | 19.806 | 17.518 | 18.428 | 18.455 |
| Education | 478.087 | 548.144 | 477.157 | 566.951 | 16.356 | 19.028 | 18.648 | 18.387 |
| History | 601.434 | 541.155 | 545.793 | 559.139 | 18.000 | 18.291 | 18.450 | 18.446 |
| Law | 619.123 | 540.632 | 617.284 | 558.000 | 20.023 | 18.073 | 18.418 | 18.450 |
| Library Science | 594.410 | 541.044 | 514.096 | 559.716 | 17.193 | 18.477 | 18.465 | 18.440 |
| Psychology | 585.228 | 539.529 | 564.979 | 558.639 | 17.626 | 17.348 | 18.489 | 18.505 |
| Public Administration | 535.657 | 542.034 | 515.469 | 559.786 | 16.111 | 17.463 | 18.488 | 18.463 |
| Social Work | 526.100 | 542.204 | 487.242 | 560.274 | 14.104 | 16.334 | 18.523 | 18.483 |
| Guidance | 515.068 | 542.608 | 494.192 | 560.638 | 16.015 | 18.062 | 18.507 | 18.454 |

Table 12

Multiple Correlation between Figure Location Test and GRE-Verbal and Quantitative Tests and with Major Field

| | GRE-V and Q | GRE-V and Q and major field |
|---|---|---|
| Agriculture | .50 | .50 |
| Biochemistry | .57 | .57 |
| Biology | .55 | .55 |
| Business and Commerce | .52 | .53 |
| Chemistry | .47 | .48 |
| Computer Science | .68 | .68 |
| Economics | .51 | .52 |
| Education | .52 | .52 |
| Educational Administration | .57 | .57 |
| Electrical Engineering | .49 | .49 |
| English | .62 | .62 |
| Geology | .55 | .57 |
| Guidance | .51 | .51 |
| History | .50 | .50 |
| Hospital Administration | .58 | .59 |
| Law | .63 | .64 |
| Library Science | .65 | .65 |
| Medicine | .52 | .52 |
| Music | .55 | .60 |
| Nursing | .45 | .45 |
| Other Biological Sciences | .57 | .58 |
| Other Social Science | .49 | .49 |
| Psychology | .53 | .54 |
| Public Administration | .55 | .56 |
| Religion | .50 | .52 |
| Social Work | .52 | .55 |
| Veterinary Medicine | .49 | .49 |

additional confirmation that the Figure Location Test is not providing unique information related to choice of majors, over and above that available in other measures. Data from these analyses are in Appendix E-1 and E-2. Discipline Groups are listed in Appendix E-3.

## Discussion and Conclusions

From the data available, it must be concluded that while the Figure Location Test taken by itself does relate to both choice of undergraduate and graduate major field, it adds a neglible increment when considered along with other predictors. The reasons for this became clear from the study by Ward, et al (1978) of cognitive factors. After extracting eight factors from a battery of 21 cognitive tests, they added several other tests to the analysis by extension. The GRE-Verbal and Quantitative Tests and the Figure Location Test were among those so added. One or both of the GRE Aptitude Tests had significant loadings on seven of the eight factors. The Figure Location Test also had significant loadings on these same seven factors.

These findings differ from those of Witkin, et al (1977b), where they concluded that the Group Embedded Figures Test mode an independent contribution to prediction of major field choice. The difference may be due in part to the fact that the Witkin study began with undergraduate students earlier in their academic careers, while the present study began with students entering or already in graduate school. A second factor is that the Witkin study dealt with students in a single rather selective college, while the present study included students from many different schools. The observed intercorrelation among test scores were much lower in the Witkin study, probably due to the restricted range, and thus the Group Embedded Figures Test could show greater effect.

Considering all of the data at hand, it does not appear that it would be useful to conduct further research on the Figure Location Test as a general predictor of academic choice or success in the context of the GRE.

# APENDIXES

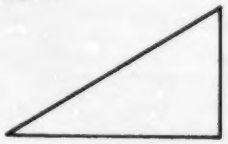
Appendix A

## FIGURE LOCATION TEST

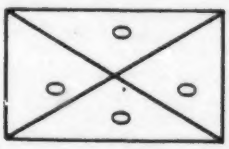
INSTRUCTIONS: This test consists of a series of problems which test your ability to find a simple form hidden in a complex figure.

Below is an example of a simple figure form (A) and its corresponding complex figure (B).

EXAMPLE 1.



A

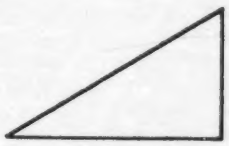


B

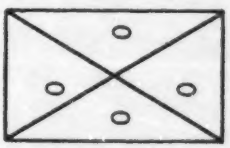
In order to solve each problem, you must locate the simple form within the complex figure. In each case the simple form will appear in the same size, in the same proportions and facing in the same direction, in the complex figure. To answer each problem you might go through steps similar to the following ones.

STEP

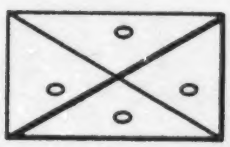
1. Study the simple form.



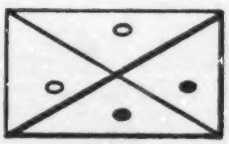
2. Inspect the corresponding complex figure for the hidden simple form.



3. Outline the hidden simple form either visually or with a pencil.



4. Blacken all of the ovals which appear in the hidden simple form.



47

GRE GRADUATE RECORD EXAMINATIONS: FIGURE LOCATION TEST QUESTIONNAIRE

DO NOT MAKE ANY MARKS IN THIS AREA.

USE ONLY A SOFT LEAD PENCIL (NO. 2) DO NOT USE INK OR BALL-POINT PEN.

1. PERMANENT HOME ADDRESS
In the boxes below, indicate an address which will reach you in the spring of 1978. Below each box blacken the corresponding oval. To indicate a space in address, blacken the corresponding diamond.

Street Address

City

State

U.S. Zip Code

CONTINUED ON REVERSE SIDE

SIDE 1

2. Did you shift majors (including shifting from a preliminary major) during your undergraduate career?

- ○ No
- ○ Yes

If yes please code your original major according to the list below.

3. How satisfied were you with your undergraduate major field?

- ○ Well satisfied
- ○ Moderately satisfied
- ○ Dissatisfied

4. How certain are you that your intended graduate major is the one you really want?

- ○ Very uncertain
- ○ Somewhat uncertain
- ○ Fairly certain
- ○ Very certain

5. Did you have a designated minor field in your undergraduate program?

- ○ No
- ○ Yes

If yes, please code the appropriate field according to the list below.

6. How satisfied were you with your minor field in your undergraduate program?

- ○ Well satisfied
- ○ Moderately satisfied
- ○ Dissatisfied
- ○ Does not apply

7. How would you rate a test such as the Figure Location Test in comparison to a vocabulary test?

- ○ Much prefer the vocabulary test
- ○ Somewhat prefer the vocabulary test
- ○ About the same
- ○ Somewhat prefer the Figure Location Test
- ○ Much prefer the Figure Location Test

8. How would you rate a test such as the Figure Location Test in comparison to a test of mathematics?

- ○ Much prefer the mathematics test
- ○ Somewhat prefer the mathematics test
- ○ About the same
- ○ Somewhat prefer the Figure Location Test
- ○ Much prefer the Figure Location Test

FIELD CODE LIST

BIOLOGICAL SCIENCES

31 Agriculture
32 Anatomy
05 Audiology
33 Bacteriology
34 Biochemistry
35 Biology
36 Biophysics
37 Botany
38 Dentistry
39 Entomology
40 Forestry
06 Genetics
41 Home Economics
25 Hospital and Health Services Administration
42 Medicine
07 Microbiology
43 Nursing
77 Nutrition
44 Occupational Therapy
45 Optometry
46 Osteopathy
08 Parasitology
56 Pathology
03 Pharmacology
47 Pharmacy
48 Physical Therapy
49 Physiology
50 Public Health
51 Veterinary Medicine
52 Zoology
30 Other Biological Sciences

PHYSICAL SCIENCES

54 Applied Mathematics
61 Astronomy
62 Chemistry
78 Computer Sciences
63 Engineering, Aeronautical
64 Engineering, Chemical
65 Engineering, Civil
66 Engineering, Electrical
67 Engineering, Industrial
68 Engineering, Mechanical
69 Engineering, Other
71 Geology
72 Mathematics
73 Metallurgy
74 Mining
75 Oceanography
76 Physics
59 Statistics
60 Other Physical Sciences

HUMANITIES

11 Archaeology
12 Architecture
26 Art History
13 Classical Languages
28 Comparative Literature
53 Dramatic Arts
14 English
29 Far Eastern Languages and Literature
15 Fine Arts, Art, Design
16 French
17 German
58 Italian
04 Linguistics
19 Music
57 Near Eastern Languages and Literature
20 Philosophy
21 Religious Studies or Religion
22 Russian
23 Spanish
24 Speech
10 Other Foreign Languages
98 Other Humanities

SOCIAL SCIENCES

27 American Studies
81 Anthropology
82 Business and Commerce
83 Communications
84 Economics
85 Education (including M.A. in teaching)
01 Educational Administration
09 Educational Psychology
70 Geography
92 Government
99 Guidance and Counseling
86 History
87 Industrial Relations and Personnel
88 International Relations
18 Journalism
89 Law
90 Library Science
91 Physical Education
92 Political Science
93 Psychology
94 Public Administration
55 Slavic Studies
79 Social Psychology
95 Social Work
96 Sociology
97 Urban Development (Regional Planning)
80 Other Social Services

02 Not included in the above categories

GRE GRADUATE RECORD EXAMINATIONS: FIGURE LOCATION TEST QUESTIONNAIRE

# SIDE 1

DO NOT MAKE ANY MARKS IN THIS AREA.

**USE ONLY A SOFT LEAD PENCIL (NO. 2). DO NOT USE INK OR BALL-POINT PEN.**

1. Did you enter graduate school?

   ① Entered fall 1977
   ② Entered prior to fall 1977
   ③ Entered after fall 1977
   ④ Did not enter

   (If you have entered graduate school, go on to question 5.)

2. If you did not enter graduate school, please indicate the reason below that most nearly describes your situation.

   ① I was not accepted by any school.
   ② I was accepted but basically was forced to let the opportunity pass.
   ③ I was accepted but chose not to enter at this time.

3. Do you plan to enter graduate school in the near future?

   ① No
   ② Possibly
   ③ Yes

4. If you do plan to enter in the near future, please select the most likely major field from the list provided, and code the corresponding number in the boxes to the right. Blacken the corresponding oval below each box.

   MAJOR FIELD

   (If you did not enter graduate school, please answer only questions 15 and 16 concerning attitudes. Do not answer the other questions which deal with graduate school.)

5. Please indicate your present major field by coding the corresponding number, from the list provided, into the boxes to the right. Blacken the corresponding oval below each box.

   MAJOR FIELD

6. If you feel that the closest major field listing does not describe your major field very well, darken the oval below and write in a better description on the lines provided.

   ○

7. If you did not change majors, please characterize the values that governed your choice of major field.

   1 = Strong factor
   2 = Moderate factor
   3 = Little or no consideration

   a. Is people-oriented..... ① ② ③
   b. Has a theoretical emphasis.. ① ② ③
   c. Is highly structured..... ① ② ③
   d. Gives opportunity to contribute new knowledge..... ① ② ③
   e. Gives opportunity to achieve through one's own efforts... ① ② ③
   f. Rewards are based on outstanding achievements..... ① ② ③
   g. Emphasizes the use of intellectual skills..... ① ② ③

8. If you had an earlier, different graduate major, please indicate this field by coding the corresponding number, from the list provided, into the boxes to the right. Blacken the corresponding oval below each box.

   MAJOR FIELD

9. If you changed majors, please characterize the rationale for that change by using the scales below. Use the midpoint as a neutral position or when you are uncertain. Indicate degrees of appropriateness by blackening oval 1, 2, or 3 in the appropriate direction.

   My new major is:

   a. More people-centered ① ② ③ (M) ① ② ③ Less people-centered
   b. Emphasizes my intellectual skills ① ② ③ (M) ① ② ③ Emphasizes my practical skills
   c. More popular ① ② ③ (M) ① ② ③ Less popular
   d. More narrowly defined ① ② ③ (M) ① ② ③ More broadly inclusive
   e. More challenging ① ② ③ (M) ① ② ③ Less challenging

10. How satisfied are you that your present major field of study is the one you really want?

    ① Well satisfied
    ② Moderately satisfied
    ③ Dissatisfied

Questionnaire continued on side 2.



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11. Approximately what is your overall grade average for your graduate work to date?

① A ④ B ⑦ C
② A– ⑤ B– ⑧ C–
③ B+ ⑥ C+ ⑨ no grades

12. Approximately what is your grade average for your graduate work in subjects in your major field only to date.

① A ④ B ⑦ C
② A– ⑤ B– ⑧ C–
③ B+ ⑥ C+ ⑨ no grades

13. What is the highest degree you plan to obtain?

① Bachelor's
② Master's
③ Ph. D.
④ Ed. D.
⑤ Other

14. Which of the following have you done during the current academic year? (Mark as many as apply.)

① Attended one or more meetings of a scholarly or professional society.
② Subscribed to two or more scholarly or professional journals.
③ Been author or coauthor of a scientific paper which was accepted for presentation at a professional meeting.
④ Been author or coauthor of a scientific paper which was submitted for publication to a professional journal.
⑤ Been author or coauthor of a scientific paper which was accepted for publication by a scholarly or professional journal.
⑥ Prepared a detailed proposal or plan for a dissertation, master's thesis, or other major research project.
⑦ Conducted an independent research project.
⑧ Conducted a research project in collaboration with another student or faculty member.
⑨ Taught a section of an undergraduate course.
⑩ Taught a section of an undergraduate class on one or several occasions.
⑪ Frequently advised or tutored other graduate students on technical or statistical problems.
⑫ Assisted in editing of text or preparation of bibliographic material for a publication.
⑬ Designed and built a piece of laboratory equipment.
⑭ Learned to operate or maintain a piece of electronic equipment.
⑮ Programmed a computer to analyze research data.
⑯ Held a student government office.

(#14 continued top of next column.)

⑰ Participated in a "special interest" organization, such as a biology club, drama club, etc.
⑱ Served on a student - faculity committee.
⑲ Held an assistantship or fellowship.
⑳ Held a job, other than an assistantship or fellowship.
㉑ Edited a student journal or similar publication.
㉒ Reviewed manuscripts for a publication.
㉓ Acted in a play.
㉔ Created a work of art.
㉕ Participated in a musical program.

15. Please evaluate each of the following values with respect to it's importance to you in shaping your life's work.

Scale: ① Important ② ③ ④ ⑤ ⑥ ⑦ Unimportant

a. Intellectuality. Dealing with abstractions, theory. ① ② ③ ④ ⑤ ⑥ ⑦
b. Productivity. Getting things done, smoothly and well. ① ② ③ ④ ⑤ ⑥ ⑦
c. Aesthetics. Dealing with the beautiful, attractive or harmonious in life. ① ② ③ ④ ⑤ ⑥ ⑦
d. Altruism. Helping others, particulary those in need. ① ② ③ ④ ⑤ ⑥ ⑦
e. Leadership. Directing the activities of a group. ① ② ③ ④ ⑤ ⑥ ⑦
f. Integration. Achieving a sense of personal oneness or wholeness. ① ② ③ ④ ⑤ ⑥ ⑦

16. Will you please characterize yourself on the following scales? Use the midpoint as a neutral position or when you are uncertain. Indicate degrees of appropriateness by blackening oval 1, 2, or 3 in the appropriate direction.

a. Easygoing ③ ② ① Ⓜ ① ② ③ Intense
b. Leader ③ ② ① Ⓜ ① ② ③ Follower
c. Liberal ③ ② ① Ⓜ ① ② ③ Conservative
d. Outgoing ③ ② ① Ⓜ ① ② ③ Reserved
e. Liked ③ ② ① Ⓜ ① ② ③ Disliked
f. Teacher ③ ② ① Ⓜ ① ② ③ Researcher
g. Unique ③ ② ① Ⓜ ① ② ③ Common
h. Concentrated ③ ② ① Ⓜ ① ② ③ Distractable
i. Confident ③ ② ① Ⓜ ① ② ③ Diffident
j. Thinker ③ ② ① Ⓜ ① ② ③ Doer

17. If your present field is psychology, which of the following best describes your intended area of specilization?

① Clinical
② Cognitive
③ Counseling
④ Developmental
⑤ Educational
⑥ Experimental, Comparative, or Physiological
⑦ Measurement
⑧ Organizational, Personnel
⑨ Personality
⑩ School
⑪ Social
⑫ Other: _____

18. If your present graduate field is education, which of the following best describes your intended area of specilization?

① Education of the mentally retarted
② Speech pathology
③ Media specialist - library and audio - visual services
④ Reading specialist
⑤ Foreign language instruction
⑥ Speech - communication and theatre
⑦ Home economics
⑧ Art education
⑨ Physical education
⑩ Business education
⑪ Social studies instruction
⑫ Science instruction
⑬ Mathematics instruction
⑭ English language and literature
⑮ Industrial arts
⑯ Early childhood
⑰ Guidance counselor
⑱ Administration and supervision
⑲ Audiology
⑳ Elementary education
㉑ Secondary education
㉒ Higher education
㉓ Adult education
㉔ Special education
㉕ Measurement
㉖ Curriculum design
㉗ Other: _____

SIDE 2

Table C-1

Means and Standard Deviations of Figure Location Test and GRE-Aptitude Test by Undergraduate Majors

| | | FLT | | GRE-V | | GRE-Q | |
|---|---|---|---|---|---|---|---|
| | N | Mean | SD | Mean | SD | Mean | SD |
| Aeronautical Engineering | 17 | 22.4 | 6.4 | 554.5 | 103.5 | 684.5 | 82.0 |
| Agriculture | 223 | 16.4 | 7.7 | 452.9 | 115.0 | 550.5 | 110.2 |
| American Studies | 28 | 17.6 | 6.8 | 587.4 | 113.6 | 532.6 | 126.4 |
| Anatomy | 2 | 20.0 | 9.0 | 549.4 | 200.3 | 533.7 | 84.5 |
| Anthropology | 124 | 17.1 | 7.7 | 582.4 | 111.6 | 534.7 | 123.0 |
| Applied Mathematics | 25 | 20.9 | 5.4 | 582.6 | 92.3 | 702.7 | 74.7 |
| Archaeology | 6 | 23.2 | 4.4 | 546.4 | 153.0 | 571.9 | 107.2 |
| Architecture | 64 | 22.4 | 7.1 | 500.8 | 120.0 | 583.9 | 98.5 |
| Art History | 77 | 18.3 | 6.8 | 590.6 | 113.5 | 512.0 | 104.1 |
| Astronomy | 7 | 26.3 | 5.1 | 680.9 | 105.0 | 734.9 | 69.4 |
| Audiology | 34 | 14.8 | 4.9 | 477.7 | 92.0 | 451.3 | 97.5 |
| Bacteriology | 12 | 18.1 | 8.1 | 566.1 | 68.6 | 626.3 | 76.4 |
| Biochemistry | 95 | 19.7 | 8.0 | 591.2 | 101.2 | 663.8 | 93.3 |
| Biology | 794 | 17.9 | 7.6 | 536.6 | 109.7 | 579.0 | 111.0 |
| Biophysics | 13 | 22.9 | 6.8 | 559.5 | 92.6 | 690.9 | 99.4 |
| Botany | 42 | 20.7 | 6.0 | 560.9 | 121.4 | 609.9 | 88.9 |
| Business | 271 | 14.9 | 8.1 | 440.7 | 116.0 | 515.0 | 117.6 |
| Chemical Engineering | 53 | 20.3 | 6.7 | 507.0 | 123.8 | 671.4 | 95.6 |
| Chemistry | 270 | 19.7 | 7.4 | 541.3 | 123.4 | 642.3 | 105.1 |
| Civil Engineering | 99 | 21.6 | 7.2 | 467.3 | 119.3 | 653.0 | 102.4 |
| Classical Language | 29 | 20.3 | 9.2 | 663.2 | 103.7 | 569.7 | 108.1 |
| Communications | 74 | 15.3 | 7.5 | 469.4 | 107.5 | 467.8 | 113.9 |
| Comparative Literature | 27 | 19.4 | 7.9 | 657.6 | 97.7 | 546.8 | 111.9 |
| Computer Science | 78 | 21.5 | 6.9 | 539.9 | 127.0 | 685.2 | 91.1 |

Table C-1 (Continued)

| | N | FLT Mean | FLT SD | GRE-V Mean | GRE-V SD | GRE-Q Mean | GRE-Q SD |
|---|---|---|---|---|---|---|---|
| Dentistry | 13 | 17.8 | 6.3 | 513.1 | 112.4 | 564.8 | 65.3 |
| Dramatic Art | 64 | 14.1 | 6.1 | 521.2 | 99.4 | 454.4 | 109.5 |
| Economics | 233 | 17.3 | 7.8 | 544.6 | 137.1 | 603.8 | 117.1 |
| Education | 927 | 13.6 | 7.4 | 448.2 | 110.2 | 441.1 | 110.4 |
| Educational Administration | 15 | 12.0 | 7.3 | 373.7 | 81.1 | 383.5 | 104.7 |
| Educational Psychology | 15 | 11.9 | 6.5 | 444.4 | 103.6 | 422.7 | 101.4 |
| Electrical Engineering | 175 | 19.5 | 8.3 | 495.2 | 134.6 | 659.6 | 102.7 |
| English | 620 | 15.2 | 7.6 | 599.6 | 121.3 | 496.5 | 118.5 |
| Entomology | 18 | 18.3 | 7.8 | 478.1 | 92.0 | 553.0 | 102.6 |
| Far Eastern Language | 10 | 14.0 | 7.2 | 515.3 | 132.1 | 523.6 | 127.8 |
| Fine Arts | 123 | 19.7 | 6.9 | 502.4 | 116.9 | 467.1 | 104.8 |
| Forestry | 35 | 16.8 | 7.0 | 461.3 | 111.4 | 568.3 | 83.3 |
| French | 80 | 15.3 | 8.0 | 560.3 | 117.7 | 492.6 | 116.5 |
| Genetics | 12 | 19.6 | 8.3 | 622.4 | 112.8 | 628.4 | 104.0 |
| Geography | 53 | 16.5 | 8.3 | 523.3 | 118.3 | 522.8 | 123.1 |
| Geology | 112 | 19.5 | 8.3 | 556.3 | 120.3 | 606.9 | 100.5 |
| German | 35 | 17.6 | 8.4 | 598.3 | 114.2 | 543.2 | 115.6 |
| Government | 368 | 14.7 | 7.4 | 533.7 | 120.4 | 517.2 | 121.2 |
| Guidance | 14 | 11.8 | 6.4 | 480.5 | 98.1 | 463.7 | 110.6 |
| History | 450 | 15.0 | 8.3 | 562.2 | 127.1 | 506.8 | 127.5 |
| Home Economics | 113 | 15.5 | 6.8 | 461.3 | 105.9 | 438.1 | 105.5 |
| Hospital & Health Services Administration | 23 | 12.3 | 7.0 | 427.3 | 103.1 | 467.9 | 95.7 |

Table C-1 (Continued)

| | N | FLT Mean | FLT SD | GRE-V Mean | GRE-V SD | GRE-Q Mean | GRE-Q SD |
|---|---|---|---|---|---|---|---|
| Industrial Engineering | 26 | 18.2 | 9.6 | 464.8 | 149.8 | 595.4 | 154.9 |
| Industrial Relations | 15 | 13.9 | 7.5 | 478.4 | 104.6 | 522.6 | 118.1 |
| International Relations | 40 | 14.7 | 5.9 | 565.1 | 118.0 | 525.4 | 103.0 |
| Italian | 4 | 11.2 | 1.6 | 547.3 | 139.6 | 439.2 | 77.4 |
| Journalism | 62 | 14.7 | 7.2 | 512.3 | 111.9 | 470.0 | 113.1 |
| Law | 11 | 11.4 | 9.1 | 447.2 | 123.5 | 437.4 | 152.7 |
| Library Science | 16 | 11.7 | 6.6 | 457.8 | 108.1 | 422.8 | 81.5 |
| Linguistics | 18 | 18.5 | 8.8 | 639.1 | 129.5 | 590.5 | 124.3 |
| Mathematics | 272 | 21.3 | 7.5 | 538.1 | 136.8 | 677.3 | 92.2 |
| Mechanical Engineering | 82 | 19.9 | 7.5 | 480.2 | 139.4 | 651.5 | 119.8 |
| Medicine | 21 | 17.6 | 5.8 | 530.1 | 129.1 | 559.9 | 115.0 |
| Metallurgy | 7 | 18.3 | 6.9 | 474.6 | 143.2 | 627.1 | 130.8 |
| Microbiology | 104 | 18.5 | 8.2 | 512.0 | 107.5 | 591.8 | 96.7 |
| Mining | 1 | 12.0 | 0 | 213.1 | 0 | 195.6 | 0 |
| Music | 194 | 17.7 | 7.5 | 509.8 | 126.1 | 492.4 | 126.9 |
| Near Eastern Language | 3 | 16.7 | 5.2 | 584.5 | 128.0 | 486.9 | 73.3 |
| Nursing | 247 | 13.6 | 7.6 | 504.5 | 96.8 | 471.2 | 106.4 |
| Nutrition | 66 | 16.8 | 6.9 | 493.5 | 105.3 | 525.7 | 122.9 |
| Occupational Therapy | 8 | 13.6 | 6.0 | 442.5 | 136.0 | 446.0 | 116.1 |
| Oceanography | 4 | 23.8 | 5.1 | 629.9 | 79.7 | 594.8 | 91.4 |
| Other Engineering | 67 | 20.1 | 8.3 | 528.8 | 126.1 | 659.6 | 90.1 |

Table C-1 (Continued)

| | N | FLT Mean | FLT SD | GRE-V Mean | GRE-V SD | GRE-Q Mean | GRE-Q SD |
|---|---|---|---|---|---|---|---|
| Parasitology | 1 | 23.0 | 0 | 434.9 | 0 | 775.2 | 0 |
| Pathology | 12 | 15.6 | 8.3 | 443.6 | 111.0 | 427.1 | 110.5 |
| Pharmacology | 5 | 8.2 | 8.5 | 503.9 | 67.6 | 532.0 | 121.1 |
| Pharmacy | 27 | 13.4 | 9.4 | 483.8 | 111.7 | 578.3 | 109.9 |
| Philosophy | 125 | 16.2 | 8.6 | 614.6 | 124.7 | 555.9 | 121.3 |
| Physical Education | 175 | 13.9 | 7.1 | 414.6 | 101.8 | 443.1 | 109.6 |
| Physical Therapy | 10 | 16.0 | 6.5 | 460.9 | 110.4 | 504.5 | 89.5 |
| Physics | 165 | 21.8 | 8.3 | 598.0 | 134.8 | 694.4 | 102.7 |
| Physiology | 17 | 19.9 | 7.8 | 561.1 | 95.2 | 615.1 | 104.5 |
| Psychology | 1300 | 16.1 | 7.4 | 546.4 | 113.9 | 536.4 | 115.0 |
| Public Administration | 31 | 14.2 | 7.5 | 476.7 | 119.7 | 488.0 | 136.1 |
| Public Health | 16 | 11.6 | 6.0 | 445.2 | 84.3 | 492.1 | 122.9 |
| Religion | 60 | 16.0 | 8.8 | 583.1 | 108.0 | 529.9 | 112.5 |
| Russian | 14 | 15.6 | 6.4 | 595.3 | 152.4 | 518.4 | 108.1 |
| Slavic Study | 2 | 21.0 | 7.0 | 520.8 | 50.1 | 660.5 | 6.0 |
| Social Psychology | 22 | 14.3 | 7.0 | 516.4 | 87.8 | 476.3 | 124.7 |
| Social Work | 109 | 13.0 | 7.6 | 454.3 | 111.0 | 443.5 | 118.1 |
| Sociology | 277 | 13.1 | 7.4 | 498.5 | 123.1 | 474.4 | 125.4 |
| Spanish | 66 | 14.3 | 7.9 | 512.4 | 121.2 | 461.4 | 109.4 |
| Speech | 172 | 14.7 | 7.1 | 479.3 | 106.2 | 466.3 | 103.5 |
| Statistics | 13 | 22.1 | 4.8 | 549.2 | 154.5 | 684.8 | 89.1 |
| Urban Development | 33 | 16.9 | 7.9 | 522.3 | 111.5 | 534.3 | 126.0 |
| Veterinary Medicine | 141 | 18.5 | 7.1 | 491.6 | 97.3 | 571.7 | 103.1 |
| Zoology | 198 | 18.9 | 7.4 | 534.8 | 94.1 | 594.1 | 82.7 |

Table C-2

Means and Standard Deviations of Figure Location Test and GRE-Aptitude Test by Intended Graduate Majors

| | | FLT | | GRE-V | | GRE-Q | |
|---|---|---|---|---|---|---|---|
| | N | Mean | SD | Mean | SD | Mean | SD |
| Aeronautical Engineering | 12 | 22.4 | 7.8 | 560.8 | 105.3 | 670.3 | 89.6 |
| Agriculture | 126 | 15.5 | 8.2 | 449.1 | 122.5 | 539.2 | 112.9 |
| American Studies | 17 | 19.4 | 6.9 | 618.7 | 90.2 | 548.1 | 115.3 |
| Anatomy | 12 | 16.7 | 8.9 | 563.2 | 114.3 | 572.8 | 79.7 |
| Anthropology | 97 | 16.9 | 7.1 | 584.7 | 109.8 | 523.8 | 121.1 |
| Applied Mathematics | 16 | 21.7 | 7.1 | 557.2 | 100.7 | 705.9 | 67.9 |
| Archaeology | 28 | 20.3 | 7.3 | 565.9 | 129.3 | 536.2 | 108.0 |
| Architecture | 90 | 22.0 | 7.1 | 533.8 | 127.6 | 590.8 | 101.2 |
| Art History | 59 | 17.7 | 7.4 | 604.4 | 119.7 | 503.8 | 108.9 |
| Astronomy | 12 | 23.2 | 6.6 | 630.2 | 131.8 | 671.0 | 138.6 |
| Audiology | 42 | 14.4 | 4.9 | 460.2 | 95.5 | 434.8 | 91.1 |
| Bacteriology | 12 | 18.0 | 7.7 | 491.4 | 116.1 | 576.1 | 122.0 |
| Biochemistry | 117 | 19.5 | 7.8 | 579.7 | 112.2 | 651.6 | 108.5 |
| Biology | 155 | 18.3 | 7.8 | 545.6 | 121.2 | 592.7 | 108.2 |
| Biophysics | 20 | 21.8 | 6.5 | 618.9 | 117.3 | 692.4 | 83.4 |
| Botany | 37 | 21.5 | 6.7 | 571.8 | 96.0 | 606.1 | 87.2 |
| Business | 267 | 16.6 | 7.6 | 476.4 | 129.0 | 558.4 | 120.1 |
| Chemical Engineering | 52 | 20.6 | 7.5 | 512.5 | 121.8 | 684.3 | 98.6 |
| Chemistry | 159 | 19.8 | 7.0 | 544.8 | 119.4 | 645.9 | 99.5 |
| Civil Engineering | 85 | 21.5 | 7.4 | 446.3 | 125.6 | 638.7 | 108.2 |
| Classical Language | 21 | 19.9 | 8.1 | 655.7 | 105.0 | 597.5 | 86.9 |
| Communications | 89 | 16.1 | 6.7 | 510.3 | 117.9 | 503.3 | 107.4 |
| Comparative Literature | 32 | 17.0 | 9.1 | 655.4 | 113.5 | 539.5 | 94.4 |
| Computer Science | 157 | 20.1 | 7.8 | 529.3 | 150.4 | 661.9 | 99.8 |

Table C-2 (Continued)

| | N | FLT Mean | FLT SD | GRE-V Mean | GRE-V SD | GRE-Q Mean | GRE-Q SD |
|---|---|---|---|---|---|---|---|
| Dentistry | 24 | 18.9 | 7.3 | 536.2 | 104.2 | 632.7 | 75.5 |
| Dramatic Art | 56 | 14.8 | 6.5 | 532.9 | 104.3 | 474.9 | 130.9 |
| Economics | 188 | 17.0 | 8.0 | 552.6 | 140.0 | 612.8 | 118.9 |
| Education | 999 | 14.3 | 7.7 | 459.9 | 114.7 | 454.9 | 116.6 |
| Educational Administration | 265 | 12.6 | 7.8 | 446.8 | 116.3 | 446.8 | 138.8 |
| Educational Psychology | 96 | 14.6 | 7.2 | 505.0 | 112.6 | 470.5 | 112.2 |
| Electrical Engineering | 138 | 19.3 | 8.2 | 495.2 | 137.7 | 653.4 | 103.0 |
| English | 309 | 15.8 | 7.6 | 617.7 | 111.5 | 505.2 | 122.6 |
| Entomology | 25 | 18.8 | 6.9 | 521.2 | 109.6 | 557.9 | 102.8 |
| Far Eastern Language | 5 | 18.4 | 5.7 | 523.7 | 144.1 | 586.8 | 85.6 |
| Fine Arts | 66 | 18.4 | 6.8 | 486.8 | 123.9 | 468.8 | 97.1 |
| Forestry | 28 | 17.8 | 6.1 | 488.2 | 119.8 | 569.0 | 85.8 |
| French | 24 | 16.1 | 7.4 | 534.9 | 116.5 | 493.0 | 110.4 |
| Genetics | 53 | 20.4 | 7.2 | 594.6 | 100.2 | 634.2 | 98.8 |
| Geography | 37 | 16.8 | 8.9 | 510.9 | 122.8 | 538.0 | 123.4 |
| Geology | 96 | 20.9 | 7.2 | 557.9 | 118.3 | 612.7 | 100.0 |
| German | 23 | 18.0 | 8.6 | 592.6 | 103.8 | 550.3 | 114.7 |
| Government | 145 | 13.6 | 7.8 | 543.4 | 142.3 | 524.3 | 130.6 |
| Guidance | 290 | 14.0 | 7.8 | 479.1 | 113.6 | 460.8 | 119.2 |
| History | 218 | 15.5 | 7.9 | 584.6 | 120.5 | 518.8 | 125.5 |
| Home Economics | 60 | 16.8 | 6.3 | 479.7 | 104.5 | 460.6 | 99.1 |
| Hospital & Health Services Administration | 104 | 13.0 | 7.8 | 479.4 | 121.9 | 503.4 | 121.3 |

Table C-2 (Continued)

| | N | FLT Mean | FLT SD | GRE-V Mean | GRE-V SD | GRE-Q Mean | GRE-Q SD |
|---|---|---|---|---|---|---|---|
| Industrial Engineering | 37 | 16.8 | 9.0 | 421.5 | 135.5 | 562.9 | 143.0 |
| Industrial Relations | 43 | 14.2 | 8.0 | 512.7 | 108.0 | 502.6 | 130.8 |
| International Relations Relations | 108 | 14.9 | 7.1 | 558.5 | 118.2 | 525.5 | 119.4 |
| Italian | 3 | 10.3 | 0.5 | 546.6 | 161.2 | 456.1 | 82.8 |
| Journalism | 111 | 14.7 | 7.5 | 549.1 | 123.7 | 500.8 | 123.0 |
| Law | 46 | 16.4 | 9.0 | 522.0 | 117.2 | 506.1 | 130.8 |
| Library Science | 216 | 15.5 | 7.3 | 566.5 | 123.3 | 484.7 | 111.2 |
| Linguistics | 29 | 18.0 | 8.3 | 597.1 | 110.1 | 530.3 | 119.5 |
| Mathematics | 113 | 22.1 | 7.6 | 548.4 | 126.0 | 701.6 | 86.2 |
| Mechanical Engineering | 60 | 19.3 | 8.1 | 475.1 | 150.7 | 660.8 | 119.6 |
| Medicine | 53 | 18.8 | 7.8 | 548.7 | 120.4 | 616.5 | 117.4 |
| Metallurgy | 11 | 21.4 | 6.2 | 545.5 | 142.2 | 701.4 | 70.3 |
| Microbiology | 109 | 16.6 | 8.4 | 515.6 | 110.0 | 560.8 | 103.7 |
| Mining | 1 | 0.0 | 0.0 | 578.0 | 0.0 | 570.0 | 0.0 |
| Music | 138 | 18.5 | 7.1 | 509.7 | 121.7 | 496.4 | 124.6 |
| Near Eastern Language | 8 | 13.1 | 8.1 | 635.9 | 101.0 | 496.9 | 107.3 |
| Nursing | 232 | 14.3 | 7.8 | 513.2 | 100.5 | 481.1 | 108.7 |
| Nutrition | 74 | 17.8 | 6.4 | 495.2 | 89.7 | 537.9 | 105.2 |
| Occupational Therapy | 12 | 13.1 | 9.0 | 442.0 | 88.2 | 458.5 | 110.3 |
| Oceanography | 26 | 18.1 | 9.8 | 522.3 | 105.1 | 633.2 | 110.6 |
| Optometry | 1 | 27.0 | 0 | 399.2 | 0 | 569.9 | 0 |
| Osteopathy | 2 | 22.0 | 6.0 | 396.9 | 14.1 | 507.1 | 115.4 |
| Other Engineering | 77 | 20.3 | 7.1 | 512.6 | 123.7 | 650.1 | 102.5 |

Table C-2 (Continued)

| | N | FLT Mean | FLT SD | GRE-V Mean | GRE-V SD | GRE-Q Mean | GRE-Q SD |
|---|---|---|---|---|---|---|---|
| Parasitology | 2 | 11.0 | 5.0 | 581.6 | 39.3 | 606.1 | 24.2 |
| Pathology | 40 | 15.8 | 7.4 | 497.7 | 109.2 | 504.7 | 120.4 |
| Pharmacology | 30 | 18.6 | 8.5 | 534.1 | 124.6 | 636.8 | 122.4 |
| Pharmacy | 20 | 15.3 | 10.0 | 488.6 | 115.4 | 610.9 | 97.4 |
| Philosophy | 67 | 16.6 | 8.5 | 637.3 | 120.6 | 575.7 | 119.2 |
| Physical Education | 92 | 13.9 | 6.7 | 431.3 | 103.8 | 464.0 | 103.3 |
| Physical Therapy | 63 | 16.0 | 7.2 | 508.9 | 111.4 | 547.9 | 106.8 |
| Physics | 97 | 22.7 | 8.3 | 619.5 | 118.3 | 721.4 | 76.6 |
| Physiology | 71 | 18.3 | 7.5 | 529.9 | 104.7 | 602.6 | 110.4 |
| Psychology | 967 | 16.2 | 7.4 | 557.5 | 115.5 | 542.7 | 117.2 |
| Public Administration | 269 | 13.8 | 7.8 | 492.9 | 120.5 | 482.3 | 121.2 |
| Public Health | 112 | 15.3 | 7.5 | 530.3 | 110.8 | 540.6 | 126.9 |
| Religion | 135 | 17.5 | 8.3 | 555.8 | 118.0 | 523.2 | 113.8 |
| Russian | 8 | 18.1 | 4.8 | 521.7 | 167.4 | 473.7 | 83.2 |
| Slavic Study | 2 | 7.5 | 4.5 | 485.3 | 164.9 | 487.5 | 135.0 |
| Social Psychology | 30 | 15.2 | 9.2 | 513.6 | 109.1 | 514.9 | 136.9 |
| Social Work | 209 | 12.7 | 7.1 | 484.2 | 114.4 | 467.2 | 113.7 |
| Sociology | 94 | 13.7 | 7.2 | 516.5 | 103.4 | 505.2 | 112.5 |
| Spanish | 33 | 15.4 | 8.0 | 518.9 | 143.5 | 487.8 | 140.7 |
| Speech | 150 | 14.6 | 6.7 | 479.6 | 104.6 | 465.2 | 105.4 |
| Statistics | 29 | 21.0 | 6.1 | 527.1 | 134.1 | 664.2 | 85.5 |
| Urban Development | 116 | 16.4 | 7.9 | 527.8 | 121.4 | 530.7 | 113.8 |
| Veterinary Medicine | 452 | 18.6 | 7.3 | 507.3 | 101.1 | 588.1 | 97.0 |
| Zoology | 96 | 20.4 | 6.5 | 561.6 | 104.3 | 603.1 | 75.7 |

Table C-3

Figure Location Test Score Distribution

N = 12,799

| Score | Percentage of Cases |
|---|---|
| 29 - 32 | 6 |
| 25 - 28 | 11 |
| 21 - 24 | 15 |
| 17 - 20 | 18 |
| 13 - 16 | 18 |
| 9 - 12 | 14 |
| 5 - 8 | 9 |
| 0 - 4 | 10 |

## Appendix D

### Correlations of GRE scores with Grade Point Averages by Major Fields Separately

The correlations between the GRE scores and undergraduate and graduate grade-point averages reported in Table 4 are unusually low, and it was pointed out that this was probably due to several factors: that these were self-reported grades, that they were pooled across subject matter fields, and that they were pooled across schools. Data on schools attended was not available, but graduate major was. Supplementary analyses were made, correlating GRE scores with each of the four types of grade point averages for the major fields separately, where there was an N of 20 or more. Table D-1 through D-4 shows the distribution of these correlations for the 23 biological and physical sciences and the 24 humanities and social sciences.

As can be seen, some correlations were negative, but most were positive, with a few as high as the .50's and .60's. Correlations with the GRE-Verbal scores tended to be higher than those for the GRE-Quantitative scores for the Humanities and social sciences, while the reverse was true for the biological and physical sciences.

These findings are consistent with those reported by Miller and Wild (1969) and Wilson (1980). Wilson, for example, reports correlations between GRE-Verbal scores and first year graduate grade-point averages ranging from .20 to .54 in primarily verbal fields, and between GRE-Quantitative scores and first year graduate grade point averages ranging from .21 to .54 in primarily quantitative fields. He also was able to compare how well officially recorded and self-reported undergraduate grade point averages correlated with first year graduate grade point averages. For the most part, the officially recorded grades produced higher correlations than did the self-reported grades.

TABLE D-1

Frequency Distributions of the Correlations
between GRE Subscores and
Overall Graduate Grade Point Average

| Correlation Coefficient | Biological and Physical Sciences (number of majors = 23) | | Humanities and Social Sciences (number of majors = 24) | |
|---|---|---|---|---|
| | Verbal | Quantitative | Verbal | Quantitative |
| .50 .59 | | 1 | 1 | |
| .40 .49 | | 1 | 1 | 1 |
| .30 .39 | 3 | 3 | 4 | 6 |
| .20 .29 | 6 | 2 | 5 | 3 |
| .10 .19 | 5 | 8 | 8 | 4 |
| .00 .09 | 2 | 3 | 3 | 8 |
| -.00 -.09 | 3 | 3 | 1 | |
| -.10 -.19 | 4 | 2 | | 1 |
| -.20 -,29 | | | | 1 |
| -.30 -.39 | | | 1 | |

TABLE D-2

Frequency Distributions of the Correlations between GRE Subscores and the Grade Point Average for Graduate Courses in the Students' Major

| Correlation Coefficient | Biological and Physical Sciences (number of majors = 23) | | Humanities and Social Sciences (number of majors = 24) | |
|---|---|---|---|---|
| | Verbal | Quantitative | Verbal | Quantitative |
| .40 - .49 | | 1 | 2 | |
| .30 - .39 | 2 | 3 | 4 | 5 |
| .20 - .29 | 4 | 2 | 5 | 4 |
| .10 - .19 | 8 | 5 | 6 | 8 |
| .00 - .09 | 3 | 7 | 4 | 4 |
| -.00 -.09 | 3 | 2 | 1 | 1 |
| -.10 -.19 | 2 | 3 | 1 | |
| -.20 -.29 | 1 | | | 2 |
| -.30 -.39 | | | 1 | |

TABLE D-3

Frequency Distributions of the Correlations between GRE Subscores and the Grade Point Average for Courses in the Students' Undergraduate Majors

| Correlation Coefficient | | Biological and Physical Sciences (number of majors = 23) | | Humanities and Social Sciences (number of majors = 24) | |
|---|---|---|---|---|---|
| | | Verbal | Quantitative | Verbal | Quantitative |
| .60 | .69 | 1 | | | |
| .50 | .59 | | 2 | | |
| .40 | .49 | 3 | 1 | 2 | 2 |
| .30 | .39 | 1 | 10 | 4 | 5 |
| .20 | .29 | 4 | 2 | 13 | 10 |
| .10 | .19 | 5 | 4 | 5 | 5 |
| .00 | .09 | 5 | 3 | | 2 |
| .00 | -.09 | 4 | 1 | | |

TABLE D-4

Frequency Distributions of the Correlations between GRE Subscores and the Grade Point Average for Courses taken during the last two years as an Undergraduate

| Correlation Coefficient | | Biological and Physical Sciences (number of majors = 23) | | Humanities and Social Sciences (number of majors = 24) | |
|---|---|---|---|---|---|
| | | Verbal | Quantitative | Verbal | Quantitative |
| .60 | .69 | | | 1 | |
| .50 | .59 | 1 | | | 1 |
| .40 | .49 | 1 | 2 | 3 | 4 |
| .30 | .39 | 3 | 6 | 3 | 2 |
| .20 | .29 | 3 | 7 | 7 | 5 |
| .10 | .19 | 7 | 4 | 7 | 10 |
| .00 | .09 | 4 | 2 | 2 | 2 |
| -.00 | -.09 | 4 | 1 | 1 | |
| -.10 | -.19 | | 1 | | |

Table E-1

Discriminant Function Analysis
of all Majors

| Variables (in order which they entered analysis) | F to Remove |
|---|---|
| GRE-Quantitative | 12.9 |
| GRE-Verbal | 8.3 |
| Question 7A | 20.8 |
| Question 7B | 5.3 |

| Function | Eigenvalue | Percent of Variance | Cumulative Percent |
|---|---|---|---|
| 1 | 1.1647 | 69.97 | 69.97 |
| 2 | .2290 | 13.76 | 83.73 |
| 3 | .1786 | 10.73 | 94.46 |
| 4 | .0922 | 5.54 | 100.00 |

Table E-2

Discriminant Function Analysis
of 9 Discipline Groups

| Variables (in order which they entered analysis) | F to Remove |
|---|---|
| GRE-Quantitative | 95.6 |
| GRE-Verbal | 37.9 |
| Question 7A | 116.6 |
| Question 7B | 14.0 |
| Undergraduate Grade Point Average | 8.8 |

| Function | Eigenvalue | Percent of Variance | Cumulative Percent |
|---|---|---|---|
| 1 | .6669 | 82.16 | 82.16 |
| 2 | .0758 | 9.34 | 91.50 |
| 3 | .0571 | 7.04 | 98.54 |
| 4 | .0095 | 1.17 | 99.72 |
| 5 | .0023 | 0.28 | 100.00 |

Table E-3

Majors by Discipline Groups

Biological Sciences

Agriculture
Botany
Forestry
Home Economics
Hospital & Health Services Administration
Zoology
Other Biological Sciences

Medically-Related Sciences

Anatomy
Audiology
Bacteriology
Biochemistry
Biology
Biophysics
Dentistry
Entomology
Genetics
Medicine
Microbiology
Nursing
Nutrition
Occupational Therapy
Optometry
Osteopathy
Parasitology
Pathology
Pharmacology
Pharmacy
Physical Therapy
Physiology
Public Health
Veterinary Medicine

Physical Sciences

Astronomy
Chemistry
Geology
Mathematics
Oceanography
Physics
Statistics
Other Physical Sciences

Applied Physical Sciences

Applied Mathematics
Architecture
Computer Sciences
Engineering, Aeronautical
Engineering, Chemical
Engineering, Civil
Engineering, Electrical
Engineering, Industrial
Engineering, Mechanical
Engineering, Other
Metallurgy
Mining

Table E-3 (Continued)

Humanities

Art History
Classical Languages
Comparative Literature
Dramatic Arts
English
Far Eastern Languages and Literature
Fine Arts, Art, Design
French
German
Italian
Linguistics
Music
Near Eastern Languages & Literature
Philosophy
Religious Studies or Religion
Russian
Spanish
Speech
Other Foreign Languages
Other Humanities

Education

Education (including M.A. in teaching)
Educational Administration
Educational Psychology
Physical Education

Organization and Directions of Society

Business and Commerce
Communications
Economics
Government
Industrial Relations and Personnel
International Relations
Journalism
Law
Library Science
Political Science
Public Administration
Urban Development (Regional Planning)

Helping People

Guidance and Counseling
Social Psychology
Social Work
Other Social Services

Studying Society

American Studies
Anthropology
Archaeology
Geography
History
Psychology
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